

Julius Rosenberg Et AL.

Referral

National

Aeronautics

And Space

Administration

No. 11

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Appeal to: Mr. Miles Waggoner
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353

4/14/57

W.F.O. Letter to HQ
with enclosures

2/32

2/32

Office Memorandum • UNITED STATES GOVERNMENT

TO : DIRECTOR, FBI
FROM : SAC, WFO
SUBJECT: WILLIAM PERL, wa
ESPIONAGE - R
PERJURY
(Bufile 65-59312)

DATE: April 14, 1951

Mr. ROBERT BELL, Security Officer, National Advisory Committee for Aeronautics, Washington, D. C., has made available photostatic copies (one each) of affidavits of the following former fellow employees of subject, concerning his loyalty:

WARREN C. BURGESS, JR.
ARTHUR N. TIFFORD
I. IRVING FINKEL
DeMARQUIS DALE WYATT
LAWRENCE R. MARCUS
N. PHILIP MILLER
EUGENE PERCHONOK
HARRY E. MOSES
MAURICE TUCKER
MYRON H. POLLYEA
HAROLD E. FRIEDMAN
EUGENE J. MANGANIELLO
ALFRED W. YOUNG
JOHN C. EVVARD
G. MERRITT PRESTON
ISIDORE MARSHAWSKY

Also furnished was a copy of affidavit of JOSEPH P. BLUM (brother-in-law of PERL), re PERL'S residence in New York; a copy of a letter of PERL'S dated April 22, 1950, to the National Advisory Committee for Aeronautics Loyalty Board relative to his association with JOEL BARR and ALFRED SARANT and his and HENRIETTA SAVIDGE'S anti-Communist sympathies; and a copy of a six-page questionnaire executed by PERL for the Loyalty Board concerning these same matters.

RLS:GLL
65-5543
Enclosure

cc-New York (65-15387) (Enclosure)

RECORDED - 76
INDEXED - 76

165-59312-353
APR 16 1951

ENCLOSURE RECORDED FILE

HANDLED
6/6/51

WFO 65-5543

Instant photostats are being furnished the Bureau and New York for information and the completion of their files. The originals of the above are part of the National Advisory Committee for Aeronautics Loyalty File concerning PERL.

ENCLOSURES TO BUREAU

WILLIAM PERL, wa
ESPIONAGE - R
PERJURY
(Bufile 65-59312)
WFO 65-5543

ENCLOSURE TO BUREAU: Photostatic copies of affidavits
of fellow employees of subject
concerning his loyalty.

65-59312-852
ENCLOSURE

Cleveland, Ohio
May 5, 1950

TO WHOM IT MAY CONCERN:

I have known Mr. William Perl ever since I entered on duty at the NACA Lewis Laboratory in June of 1944. From then until February of 1946 it was my privilege to work under him at the Cleveland laboratory of the NACA. During this period I worked closely with him on several projects in aerodynamics. Throughout this period, I found Mr. Perl motivated by a complete and sincere desire to perform his tasks to the best of his ability, regardless of the attending personal inconvenience and discomfiture.

During this period (1944-1946), occasions would arise in normal fashion in which views on existing political organizations were exchanged. Such discussions were usually philosophical and idealistic in nature. I recall nothing which might ever suggest the inclination of Mr. Perl towards any approach to government other than that of the United States. Furthermore, I have heard him assert his beliefs to the effect that our present type of government far surpasses any other type in performing the primary function of government, i.e., raising the standard of living of the governed.

I had occasion during this period to know Mr. Perl and his former wife, Henrietta, socially. Again I can assert that, while opportunity existed in the conversations to express ones views pro and con regarding political philosophies, I heard no remarks, nor was aware of any intent on the part of either of the two favoring adoption of a government other than the present form. And such intent could hardly be concealed in idealistic, intellectual discussions stimulated by friendship and appropriate beverages.

From 1946 to 1948 my contacts with Mr. Perl were through occasional correspondence and meetings of technical interest.

65-59312-350

Kr. Perl returned to the Cleveland laboratories in 1948. From that time until the present I have renewed our acquaintance both during and outside business hours. I find his present political philosophies and interests the same now as they were in 1946.

Warren C. Burgess, Jr.

Warren C. Burgess, Jr.
Lewis Flight Propulsion
Research Laboratory
NACA, Cleveland, Ohio
4072 Grace Road
North Olmsted, Ohio

Subscribed and sworn to before me this 9th day of
May, 1950 by Warren C. Burgess, Jr. who is to me
personally known.

Josephine M. Case

Josephine M. Case, Notary Public
Commission Expires October 23, 1952

April 24, 1950

To Whom It May Concern:

I have been informed that the loyalty to the United States Government of Mr. William Perl of Cleveland, Ohio is being seriously questioned. I wish to make the following statement on this matter.

In 1939 Mr. Perl, Mr. Frederick Bryant (now living in Washington, D. C.) and I, all bachelors at the time, jointly rented a 5 room apartment at 240 Newport News Ave., Hampton, Va. We lived together in this apartment for the three months of June, July and August.

It has been remarked by many that "one does not really know a person until one has lived with him". In line with this adage, we certainly did learn a lot about each other. Accordingly I feel particularly qualified to make a statement concerning Mr. Perl's personal outlook on life and the world.

I do not recall any remarks or occurrences during the three months of joint residence or the occasional meetings during the ensuing years that would lead me to question the loyalty of Mr. Perl as a citizen of the United States. He is primarily interested in good classical music and in increasing his grasp of advanced mathematics and physics. He is unusually detached from social and political interests. I recall many occasions on which he turned down an evening with "the boys" for an evening with Wilson's "Advanced Calculus". I'm convinced that the aims and ideals of this man are in the realm of "pure Science" and not in the realm of "radical politics".

Sincerely yours,

Arthur N. Tifford

Arthur N. Tifford,
Associate Professor,
Aeronautical Engr. Dept.,
The Ohio State University

ANT/jh

State of Ohio
County of Franklin

Subscribed to and subscribed
before me this 20th day of April, 1950.

Virginia T. Miller
VIRGINIA T. MILLER, Notary Public
My Commission Expires Jan. 26, 1952

4671 W. 210th Street
Fairview Park
Cleveland 26, Ohio
April 24, 1950

TO WHOM IT MAY CONCERN:

I, Irving Pinkel, do hereby offer the following information in connection with Mr. William Perl. I have been employed by the NACA since August 1940, and now have the position of Associate Chief, Physics Division, Lewis Laboratory.

I have known Mr. Perl as professional associate and friend from November 1941 to the present time. Our acquaintanceship was interrupted in the periods from November 1942 to January 1944 when I was transferred to the Cleveland laboratory of the NACA, while Mr. Perl remained at the parent NACA laboratory, and from February 1946 to June 1948 when he was on leave for advanced graduate study. Our friendship has always been on an informal basis, which permitted a free expression of view point.

At intervals over these eight years I have heard Mr. Perl speak privately on a sufficient variety of subjects to reveal his position with respect to the important issues of the time. In this period he has always held the position accepted by the liberal segment of our important political parties. While I cannot quote specific statements he has made, his position is summarized by the following points:

1. Governments must serve the interests of the governed.

2. Concentration of power vested in individuals or groups who are not subject to removal by democratic process represent a threat to the freedom of the people.

3. With political or economic power of all types goes a responsibility for proper conduct which is subject to the scrutiny and control of the people affected.

4. No group organized for political purposes shall be permitted to exert an influence by virtue of discipline and efficiency which is greater than its just proportion as measured by its membership.

5. All human actions are governed by the accepted standards of decency and fair play.

These principles are consistent with the democratic ideal that is basic to our present form of government. I have never heard Mr. Perl make a statement that could be in any way construed as being disloyal to the United States Government or reflecting any allegiances to a foreign government.

I. Irving Pinkel

I. Irving Pinkel
Associate Chief,
Physics Division
Lewis Flight Propulsion
Laboratory

Subscribed and sworn to before me this 25th day of April, 1950,
by I. Irving Pinkel who is to me personally known.

Josephine M. Carr

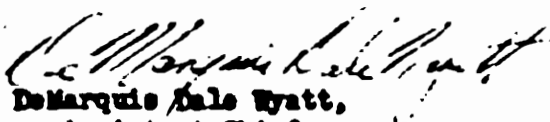
Josephine M. Carr, Notary Public
Commission Expires October 21, 1950

1324 West 108th Street,
Cleveland 2, Ohio.
April 24, 1950.

To Whom It May Concern:

This is to certify that I have been acquainted with Mr. William Perl (formerly William Mutterperl) since May, 1944. My acquaintanceship with Mr. Perl has been that of a work-associate for the most part with only a slight social acquaintanceship away from work. I had no acquaintanceship with Mr. Perl in the period from February, 1946 to June, 1948 when he was away from the NACA working on an advanced professional degree.

At no time in my acquaintanceship with Mr. Perl have I heard him express himself by word or deed in any manner that could be construed as evidence of disloyalty to the Government of the United States. I have the highest respect for Mr. Perl's character. I unhesitatingly indorse his honesty and integrity. To my knowledge there is no basis in any respect for considering Mr. Perl to be a bad moral or security risk to the Government of the United States.


DeMarquis Dale Wyatt,
Assistant Chief,
Supersonic Propulsion Division,
NACA Lewis Flight Propulsion Laboratory,
Cleveland Airport, Cleveland 11, Ohio.

Subscribed and sworn to before me this 24th day of
April 1950 by DeMarquis Dale Wyatt who is to me
personally known.


Josephine M. Case, Notary Public
Commission Expires October 23, 1950

Cleveland, Ohio
April 24, 1950

TO WHOM IT MAY CONCERN:

I have been employed in an engineering capacity by the NACA since February 1939. My home address is 4013 W. 157th Street, Cleveland 11, Ohio, at which address I have resided for the past six years.

I met Mr. Perl in the fall of 1939 in Hampton, Virginia where we were both employed at Langley Field by the NACA. He visited my home and we attended social functions together. At that time his activities, outside of work, were music appreciation and the study of aeronautics. I left Hampton for Cleveland in December 1941 and had no further contact with Mr. Perl until he was transferred to Cleveland in 1944. My professional association with Mr. Perl has been limited to a period in the spring of 1945 when I worked directly with him. In February 1946, Mr. Perl left the Laboratory to study for his doctorate, returning to Cleveland in the summer of 1948. In Cleveland, our social contacts have been intermittent and our friendship has been of a more casual nature.

To my knowledge Mr. Perl is of excellent character and I know of no reason to doubt his loyalty. In my long association with Mr. Perl, he has on all occasions in my presence conducted himself as a loyal citizen to our democratic form of government.

Lawrence R. Marcus

Lawrence R. Marcus
Aeronautical Research Scientist
Lewis Flight Propulsion Laboratory
National Advisory Committee
for Aeronautics

Subscribed and sworn to before me
this 25th day of April, 1950, by
Lawrence R. Marcus, who is to me
personally known.

Josephine A. Case
Josephine A. Case, Notary Public,
Commission Expires October 22, 1950

8430 Columbia Road,
Olmsted Falls, Ohio,
April 24, 1950

To Whom It May Concern:

I have known Mr. William Perl socially since early 1940. My contacts with him have taken place during the following periods:

Early 1940, when we were both employed by the NACA at Hampton, Virginia, until December, 1941, when I was transferred to the NACA's Lewis Laboratory at Cleveland.

January, 1944, to February, 1946, during which time Mr. Perl also worked at the Lewis Laboratory.

June, 1948, to the present, after Mr. Perl's return to the Lewis Laboratory from his graduate studies at Columbia University.

While my acquaintance with Mr. Perl has been entirely social, we have many mutual friends who know him on both professional and social bases.

I believe that Mr. Perl is a loyal citizen of the United States. It is my impression, from observation, that he is keenly aware of the advantages of citizenship in the United States and that living under our form of government has made it possible for him to pursue his education and career in a way that probably would not have been possible under any but a democratic government. I have never heard him make, or learned of his making, any expression of opinion which in my judgment could be interpreted as contrary to the welfare of the United States or its democratic form of government.


H. Philip Miller
Civil Engineer,
Lewis Flight Propulsion Laboratory

Subscribed and sworn to before me this 24th day of April, 1950
by H. Philip Miller who is to me personally known.


Joseph H. Case
Assistant to Chief, Lewis Laboratory
Cleveland, Ohio 44130

Cleveland, Ohio
April 22, 1950

Mr. James J. Kelly, Jr.
Chairman, NACA Loyalty Board
1724 F Street, Northwest
Washington 25, D. C.

Dear Mr. Kelly:

The following statements are in reply to the allegations contained in your letter of April 5, 1950.

1. Mr. Joel Barr was a member of my class in Electrical Engineering at the College of the City of New York. I can recall association with him only on the same footing as with many other members of the same class. At no time did this association have any unusual character such as, for example, political discussion biased in favor of communist causes. After my graduation in 1939 and my simultaneous employment by the NACA at Langley Field, Virginia, and until my return to New York in 1946 (see paragraph 3), I did not, to the best of my recollection, see any of the members of my graduating class, including Mr. Barr. I vaguely recall having exchanged correspondence with various members of my graduating class for about a year after graduation. The reason for this correspondence was the normal one of keeping up with the doings of the people I had known at school. It is possible, though I have no recollection of this, that Mr. Barr might have been included in this correspondence to the extent of a letter or two. After this period I lost track of my classmates, including Mr. Barr. I emphatically deny that I was in sympathetic association with Mr. Barr either at the time alleged, or at any other time. Furthermore, at no time did I ever have any reason to believe that Mr. Barr was or had ever been a member of the Communist Party or that he had communistic leanings of any kind.

Rec'd NACA 4/27/50

2. In reply to the allegation that my former wife, Henrietta Savidge, praised the Russian Communist form of government and was critical of our own form of government I assert that I never heard her make statements even remotely of this character. My opinion of her political beliefs is in fact quite the contrary to that implied by the preceding allegation. It is, namely, that she believes our own democratic form of government is quite obviously to be preferred over the Russian Communist form. I am at a loss to understand how this allegation could have arisen. It may be pertinent to add that when I left California about June 1946, my then wife, Henrietta Savidge, remained in residence there.

3. In the two year period 1946-1948 that I was in New York City attending Columbia University, I resided at the home of my parents, 936 Tiffany Street, New York, New York. During this time I felt the need of having a place of my own. In this period I wanted to meet Mr. Joel Barr who, I believe, was also attending Columbia University at the time. In conversation with him the possibility arose that I might have the occasional use of the apartment of a friend of Mr. Barr during the absence of said friend. This friend of Mr. Barr was Mr. Alfred Sarant of 65 Morton Street, New York, New York. Mr. Sarant and his family were away most of this time, so that except for one or two occasions I never saw Mr. Sarant at all. I estimate that I lived in Mr. Sarant's apartment a maximum of about a quarter of the time I was in New York. I emphatically deny that I was ever in close or sympathetic association with Mr. Alfred Sarant. I further emphatically deny that I resided with Mr. Sarant at any time and in any place. At no time did I ever have any reason to believe that either Mr. Barr or Mr. Sarant were or had ever been members of the Communist Party or had communistic leanings of any kind.

4. I emphatically deny, finally, that I have ever had close or sympathetic association with anyone who to my knowledge had communistic leanings of any kind.

5. Several affidavits in support of the preceding refutation of the charges made against me are enclosed. More are being gathered and will be submitted when they arrive.

6. If the preceding statements are not considered sufficient explanation and refutation of the charges made against me, I should like to request a hearing before the NACA Loyalty Board. Should such a hearing be necessary, it would be most convenient for me if it is held at the Lewis Laboratory. I have no preference as to the date other than that it should allow me sufficient time to complete the gathering of affidavits in time to submit them at the hearing.

Very truly yours,

William Perl

William Perl
Aeronautical Research Scientist
Lewis Flight Propulsion Laboratory.

Subscribed and sworn to before me this 24th day of April, 1950 by William Perl who is to me personally known.

Josephine M. Carr

Josephine M. Carr, Notary Public
Commission Expires October 21, 1950

April 22, 1950

TO WHOM IT MAY CONCERN

Except for the period from September 1947 to September 1948, during which I was on a leave of absence for graduate training, I have been continuously employed as Aeronautical Research Scientist by the NACA since June 1942. From June 1942 to January 1943 I was at the Langley Laboratory; and since January 1943, I have been assigned to the Lewis Laboratory.

I have known William Perl since February 1944, and I met his former wife, Henrietta, a short time after their marriage in 1944. From February 1944 until November 1945 Mr. Perl was my immediate supervisor. We shared the same office and I was in daily contact with him, officially, in the performance of my duties and informally at lunch. On numerous occasions I met socially with Mr. and Mrs. Perl at informal gatherings in their home or at the home of mutual friends.

Since his return to the Lewis Laboratory after completing his doctorate training, I have again come in contact with Mr. Perl both socially at informal gatherings in my own home and at the NACA in the performance of my duties.

In my opinion Mr. Perl's character, integrity and loyalty to our government are beyond question. I have heard both Mr. Perl and his former wife, Henrietta, express themselves on political, social, and economic issues, and neither has ever indicated a questionable loyalty to our government or an admiration toward the communist form of government. It is my impression that Mr. Perl believes in the freedom of the individual and that he is anti-communist and is opposed to dictatorship of any kind.

Eugene Perchman

Eugene Perchman
2021 Cornell Road
Cleveland 6, Ohio

Subscribed and sworn to
before me this 24th day of
April, 1950 by Eugene Perchman
who is to me personally known.

[Signature]
Notary Public
Cleveland, Ohio

616 West 116th Street
New York City, 27
April 22, 1950

To Whom It May Concern:

William Perl has requested me to write a testimonial concerning his loyalty and that of his wife to the government of the United States. The following constitutes the testimonial.

I have known William Perl since March, 1944 when I became an employee of the Cleveland Laboratories of the National Advisory Committee for Aeronautics. He was my immediate superior and we worked together on several problems. Though he left Cleveland in the early part of 1946, I saw him subsequently from time to time thereafter, particularly in the years 1947 and 1948 when we were both graduate students in the Department of Physics of Columbia University.

I feel that I am very well acquainted with Dr. Perl and that I can vouch fully for his loyalty to the government of the United States.

One of my reasons for my believing in his loyalty is that in the occasional discussions we have had concerning the relations between Russia and the United States, he has criticized Russia for its hostile and uncompromising attitude toward this country. One remark made at a time when the Russians had cut the railroads into Berlin from the western part of occupied Germany is, I think, typical. This remark, made in reply to one of mine in which I accused Russia of endangering peace by breaking treaties with the United States and Great Britain, was in agreement with my statement and in effect characterized the Russian action as arbitrary and unjustified.

Dr. Perl has also disparaged the Communist ideology in many of its aspects. As an example of his attitude toward the Communist doctrine, he once stated (in the latter part of 1949, as I recall) that he believed that the Communist doctrine with its restrictions on the directions which inquiry might take would cause the sciences (particularly physics) to deteriorate in Russia. Since Dr. Perl is a scientist whose ideal is the advancement of science, this statement is certainly very severe criticism.

Dr. Perl and I have never discussed politics per se. As far as I can determine, Dr. Perl's views, as do mine, coincide most closely with those of the liberal Democratic group whose policies have been stated by President Truman. In the last Presidential election, he stated that President Truman was the best of the candidates. In many matters, however, I believe that partisan views do not interest him.

I have not known Mrs. Perl as well as Dr. Perl, since I saw her only three or four times on social occasions in 1945. On the few occasions that I spoke to her she never said anything that could have been construed as being disloyal. I believe that I once heard her criticize

the Russian government for its treatment of the arts as exemplified by its treatment of the better-known Russian composers.

I hope this statement will be helpful in establishing the loyalty of Dr. Perl. I am at present a graduate student in the Department of Physics of Columbia University and am also employed by New York University. My address is given above.

Sincerely

Harry E. Moses
Harry E. Moses

*New York NY
April 23, 1950
Joe Bimbaum*

JOE BIMBAUM
NOTARY PUBLIC, State of New York
No. 00-0000000
[Print in Book Co. Cert. filed with
New York County, Clerk's & Register's
Commission Expires March 30, 1952]

April 22, 1950

TO WHOM IT MAY CONCERN

I have been in the employment of the Lewis Flight Propulsion Laboratory, NACA, from September 1940 to the present time in the capacity of Aeronautical Research Scientist.

My acquaintance with Dr. Perl dates from 1944 to the present. During the time he was studying for his doctorate (Feb. 1946 to June 1948 at California Institute of Technology and Columbia University) we kept in touch with each other through correspondence and personal meetings. From 1944 to the present Dr. Perl and I have worked jointly on a number of aerodynamic problems. Our acquaintance was not only of a professional nature but was also social.

During the time I have known Dr. Perl I have never heard him make any statements or known him to perform any actions that could be considered as being disloyal to the United States of America. After Dr. Perl's marriage there were various occasions on which Dr. Perl, our wives and I met (dinners, parties, etc.) To the best of my knowledge Mrs. Perl never made any statements which would indicate radical political views. If she had such views I believe the conversations carried on were of sufficient range and variety as to sooner or later have brought such views into the open. I can only recall some spirited discussions of music and modern art. My own political views are somewhat conservative in nature and I am convinced that I would have remembered any comments of an opposite viewpoint.

I consider Dr. Perl a person of high integrity and moral character and one who could be entrusted with matters concerning the security of our country.

Maurice Tecker

Maurice Tecker
10317 Avon Avenue
Cleveland, Ohio

Subscribed and sworn to before me this 22nd day of April, 1950 by Maurice Tecker who is to me personally known.

Josephine M. ...

Josephine M. ...
Cleveland, Ohio

3221 Rocky River Drive
Cleveland 11, Ohio
April 21, 1950


TO WHOM IT MAY CONCERN:

I have known Mr. William Perl since the latter part of 1940 (shortly after my employment by the National Advisory Committee for Aeronautics at Langley Field, Hampton, Virginia, on September 25, 1940).

I had personal contact with Mr. Perl at Langley Field until December 1941, when I was transferred to the Lewis Flight Propulsion Laboratory of the NACA at Cleveland. That contact was mainly of a social nature (i.e., we often ate together at the Central Restaurant, or we were occasionally invited to the same parties). During this period Mr. Perl's surname was Mutterperl.

Personal contact was renewed between January 1944, and February 1946, during which time Mr. Perl was stationed at the Cleveland laboratory, and after which Mr. Perl left to do graduate work. After Mr. Perl's return to the Cleveland laboratory in June 1948, personal contact was again resumed. The contact between January 1944 and February 1946 was both professional and social. The professional contact consisted of my rendering professional research services contributing to the conduct of research by Mr. Perl. The contact since June 1948 has also been both professional and social.

I consider that Mr. Perl's integrity and character are of the highest order. With particular reference to Mr. Perl's loyalty to the United States, I wish to state that at no time, in my presence or knowledge, has Mr. Perl ever indicated, spoken, or implied anything that in my opinion was adverse or disparaging, or would do any disservice to the present democratic system of government in the United States.


Myron H. Pollack
Aeronautical Research Scientist
NACA, Lewis Flight
Propulsion Laboratory
Cleveland 11, Ohio

Subscribed and sworn to before me
this 23th day of April, 1950, by Myron
H. Pollack who is to me personally
known.


Joseph A. Carr, Notary Public
Cleveland, Ohio, Order No. 1950

NACA Lewis Flight Propulsion
Laboratory,
Cleveland Airport,
Cleveland 11, Ohio.
April 21, 1950.

To Whom It May Concern:

I have known Mr. William Perl for approximately ten years. I first met him about December, 1940, at Hampton, Virginia, where we were both employed by the National Advisory Committee for Aeronautics at the Langley Aeronautical Laboratory. During 1941 I attended a number of social affairs, week-end hiking trips, etc., at which Mr. Perl was present. In December, 1941, I was transferred to the NACA's Lewis Flight Propulsion Laboratory in Cleveland, and in 1944 Mr. Perl was also transferred here. At Cleveland we were both in the same research division and from time to time worked together. Occasionally, we also associated socially. In March, 1946, for different reasons, both Mr. Perl and I left the NACA, and in 1948 we both returned to its employ. Since that time I have known Mr. Perl as a friend of long standing.

During the entire period of our association I have never heard Mr. Perl state any views or opinions that were to my knowledge subversive or inimical to the philosophy of our democratic form of government. In my opinion, which is based on observations of his actions and work for approximately ten years, Mr. Perl is a loyal American citizen.

Harold E. Friedman

Harold E. Friedman,
Mechanical Engineer.

Home address:
4027 Rocky River Drive,
Cleveland 11, Ohio.

Subscribed and sworn to before me this 24th day
of April, 1950 by Harold E. Friedman who is to me personally
known.

Josephine M. Case

Josephine M. Case, County Clerk
Cleveland County, Ohio, April 24, 1950

April 20, 1950.

TO WHOM IT MAY CONCERN:

I have been associated with William Perl professionally and socially, during his employment at the NACA Langley and Cleveland Laboratories from 1939 to date (except between February 1946 and June 1948 when he took advanced courses at California Institute of Technology and Columbia University).

As a fellow employee of the NACA I had frequent contacts with him during working hours through consultations and discussions on research problems and through luncheon conversations. Socially I met with him periodically for handball games, occasionally at parties and recently at meetings of the Cleveland group of the College of The City of New York Alumni Association.

During the years that I have associated with William Perl, I have never observed him perform any act nor heard him make any statement that could be construed as being disloyal to the United States Government. To the contrary, I recall one occasion, when in a discussion of ideologies and forms of government he made positive statements concerning his belief in our democratic form of government and way of life.

In summary, I have no reason to doubt that William Perl is a loyal, patriotic and trustworthy citizen and can be relied upon in matters concerning the safety and security of the country.

Eugene J. Manginello

Eugene J. Manginello,
Assistant Chief of Research.

Lewis Flight Propulsion Laboratory,
Cleveland, Ohio.

Subscribed and sworn to before me this 20th day of April, 1950, by
Eugene J. Manginello who is to me personally known.

Josephine M. Carr

Josephine M. Carr, Notary Public
Commission Expires October 24, 1950

Cleveland, Ohio

April 20, 1950

To whom it may concern:

I, Alfred W. Young, make the following statement concerning my acquaintance with William Perl-

I have been continuously employed as a mechanical engineer by the National Advisory Committee for Aeronautics since December 27, 1928, first at Langley Field, Virginia, and, since January, 1942, at Cleveland, Ohio. I first met William Hutterperl at Langley Field a year or two before I was transferred to Cleveland. I had only casual contacts with him at that time and formed no particular impressions about him.

In 1944 Mr. Hutterperl was transferred to Cleveland and placed in charge of a group of analytical workers in the altitude wind tunnel office building, where I was also located. Some time after coming to Cleveland Mr. Hutterperl changed his name to William Perl. We had the same supervisor, Mr. Abe Silverstein, and we were in frequent contact in small meetings or in casual conversation. Occasionally we attended the same social gatherings.

In February, 1946, Mr. Perl left the N.A.C.A. for advanced study. He returned in June, 1948, but he was assigned to a different building, and my contacts with him recently have not been frequent.

I have never heard Mr. Perl make any statements expressing sympathy for communist views, and no one else has mentioned to me any such statements. I think it is probable that I would have been informed if Mr. Perl had shown any desire to overthrow the government of this country or to further the interests of the communist party or a foreign government.

Alfred W. Young

Subscribed and sworn to before me this 20th day of April 1950
by Alfred W. Young who is to me personally known.

Josephine M. Carr

Josephine M. Carr, Notary Public
Cleveland, Ohio, Expires 24, 1954

NACA Lewis Flight Propulsion
Laboratory,
Cleveland Airport,
Cleveland 11, Ohio.
April 20, 1950.

To Whom It May Concern:

I have been associating with Mr. William Perl both socially and in a technical capacity since November, 1945. He is a logical and careful scientist devoting most of his time to original and creative research. His main interest has always been to achieve a deeper understanding of the physical laws. He has never expounded or advocated racial or political creeds in my presence nor has he shown any sympathy for communism or the communist party. I believe him to be a brilliant, faithful, and conscientious American.

John C. Evvard
John C. Evvard, Chief,
Supersonic Propulsion Division.

Subscribed and sworn to before me this 21st day of
April, 1950, by John C. Evvard who is to me personally
known.

Josephine M. Conn
Josephine M. Conn, Notary Public,
Commission Expires October 21, 1950.

JOSEPH P. BLUM
7923 - 209th STREET
Flushing QUEENS L.I. N.Y.

Witness 9-3233

April 19, 1950

To whom it may concern:

State of New York) ss
County of Bronx)

Joseph P. Blum, being duly sworn, deposes and says:

I am a Mechanical Engineer, residing in New York City since March 12, 1928, and in my own home at 79-23 209th St. Flushing, L. I. since May 27, 1940. I am married to my wife, Anne Blum, the oldest sister of William Perl since October 28, 1930.

I have known Mr. William Perl, my brother-in-law for the past twenty years. He has always resided during his stay in New York in his mother's house, whose address for the past nine years has been at 936 Tiffany Street, Bronx, N. Y.

In particular, I recall that he returned to New York in 1946 to study at Columbia University and that he then stayed at his mother's home at 936 Tiffany St. Bronx N. Y. until 1948, to the best of my knowledge.

I was present at my parents-in-law home on numerous occasions and found my brother-in-law, William Perl there at those times.

Sworn to before me this 20th
day of April, 1950.

Joseph P. Blum

Rida Wiener

ARDA WIENER
Notary Public, State of New York
No. 62-865300
Qualified in Bronx County
Cert. Filed with Bronx Co. Clk.
Commission Expires March 20, 1952

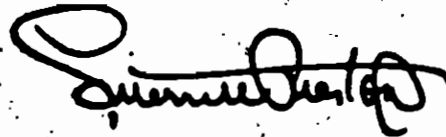
April 19, 1950

TO WHOM IT MAY CONCERN:

The undersigned is employed by the National Advisory Committee for Aeronautics at the Lewis Flight Propulsion Laboratory, Cleveland, Ohio, as an Aeronautical Research Scientist.

I have known Mr. William Perl for the past eleven years. For the initial seven years, I worked in the same research group as Mr. Perl. During the last four years, we have worked in different research groups at this laboratory.

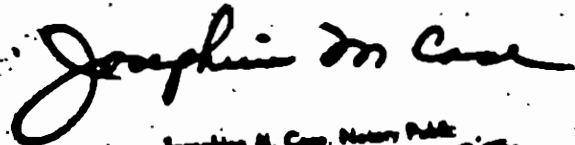
To the best of my recollection, during my entire association with Mr. Perl, I have never observed any remarks or actions of Mr. Perl's that indicated any disloyalty whatsoever to the United States Government. It is my opinion that Mr. Perl has been too engrossed in his research work for the government to concern himself with political or ideological ideas of government.



G. Merritt Preston,
81 Manning Drive,
Berea, Ohio

Subscribed and sworn to before me this 19th day of April, 1950.

by G. Merritt Preston who is to me personally known.



Josephine M. Case, Notary Public
Commission Expires October 23, 1950

AFFIDAVIT

I have known Mr. William Perl since the start of his employment at the NCA in 1939. Our association was quite close up to November, 1942, when I was transferred to Cleveland. It was resumed on more casual terms when Mr. Perl was also transferred to Cleveland and was again interrupted while he was studying for his doctorate.

At Langley Field, Mr. Perl's chief outside interests were scholastic and his diversions were music and sports. At no time did he show any intense interest in or participate in activities related to political, economic, or social ideologies or to groups concerned with such matters. At no time did he express opinions or preferences that might be interpreted as favoring illegal political or social actions. At no time was there any doubt of his personal honesty and integrity or of his loyalty to the United States. In my latest contacts with him, there is no indication that the situation has changed in any way, or that his interests lie any more strongly in the direction of political activity, or that his political or economic opinions are of other than a conservative type.

Consequently, I am able to certify that I know of no reason to doubt or to question Mr. Perl's integrity or his loyalty to the United States of America.

I hereby certify that the above facts are true to the best of my knowledge and belief.

April 18, 1950.

Isidore Warshawsky

Subscribed and sworn to before me this 19th day of April, 1950.

by Isidore Warshawsky who is to me personally known.

Mr. Isidore Marshawsky resides at 20873 Avalon Drive, Rocky River 16, Ohio. He has been employed as Physicist with the National Advisory Committee for Aeronautics since 1930. From 1930 to 1942 he was at the NACA Langley Memorial Laboratory, Langley Field, Virginia. From 1942 to the present time he has been at the NACA Lewis Flight Propulsion Laboratory, Cleveland, Ohio.

QUESTIONNAIRE

1. What has been the character and extent of your association with Joel Barr from and after your return to New York in 1946?

Within some months after my return to New York in June 1946 I encountered Mr. Barr. I believe this was a chance encounter on the Columbia University campus. I saw Mr. Barr several times thereafter on and about the Columbia University campus, several times in such places as restaurants and several times in Mr. Sarant's apartment at 65 Morton Street. On one of these last occasions Mr. Sarant was also present.

The character of my association with Mr. Barr was social and based on two themes of mutual interest that I can recall. The first was, the nature and extent to which modern ideas in physics and electrical engineering could give man an understanding of the thinking process. The second theme was the theory of the creative process in musical composition. I recall also some discussion of ideas and inventions for possible commercial exploitation. I last saw Mr. Barr sometime in 1947 or early 1948.

See memo 5/1/50

2. According to your former wife, Mr. Barr was a guest in the home then maintained by you and your former wife, but no date, place, or details are given by her. Can you give this Board any further information concerning this allegation by your former wife?

The only home that I ever maintained with my former wife was in Cleveland from September 1944 to February 1946. Mr. Barr was not a guest in our home at any time. My former wife possibly referred to meeting Mr. Barr in her own home in New York at a later period.

- 3 -
2. There is confusion as to the location of yourself and your wife in late 1945 and during the first half of 1946. Some evidence indicates that you were living in Cleveland with your then wife during the middle of 1946, and other evidence indicates that you were living with your then wife in California from sometime in late 1945 or early in 1946 until June 1946. Please give details which will resolve this confusion.

I lived with my then wife Henrietta Savidge in Cleveland from September 1944 to February 1946, and in Pasadena, California, from February 1946 to June 1946, and at no other time.

4. When and where were you married? When and where were you divorced?

I married Henrietta Savidge in New York in 1944,
and was divorced from her in Reno in 1946.

(7)

5. Please give a complete statement of the extent to which you used the apartment at 65 Morton Street, New York City, and an explanation of the arrangement under which you used that apartment.

Mr. Barr introduced me to Mr. Sarant at 65 Morton Street within some months after my return to New York in June 1946. On my suggestion, and after some discussion, Mr. Sarant gave me oral permission to use his apartment whenever I so desired, provided that he or his family were away at the time. He supplied me with a key to the apartment. If and when I desired the use of his apartment I first ascertained by telephone whether he and his family were away. If they were, I considered myself free to go and stay there. I used Mr. Sarant's apartment for periods of one to several days at a time at intervals in the period Fall of 1946 to Spring of 1948. I particularly recall staying there during the two week Christmas vacation period of 1947-1948 when I had the proper opportunity and environment to work out most of my thesis problem, "Calculation of Transonic Flow Past Thin Airfoils by an Integral Method".

8. While using the apartment at 65 Morton Street, New York City, was there any Communist literature or similar material of any sort, or did any incidents occur, which might have led you to believe that Mr. Sarant was a member of, or sympathetic with, the Communist Party?

I recall nothing of this sort. I at no time had any reason to believe that Mr. Sarant was a member of, or sympathetic with the Communist Party.

Do you have any further statements which you wish to make which you believe might help the NACA Loyalty Board in arriving at a proper determination in this case?

I wish to reiterate that my association with Mr. Barr and Mr. Sarant could in no way be construed as sympathetic in any sense connected with communist ideologies. The basis of our association had in fact no political aspects whatsoever. I never had any reason to suspect Mr. Barr or Mr. Sarant of addiction to communist ideologies. As regards my former wife, I believe the affidavits submitted previously demonstrate adequately the falseness of the allegation made concerning her.

I wish to affirm my complete loyalty to the government of the United States and to the democratic way of life as practised in the United States of America.

It happens that I believe in humanitarianism and the use of the scientific method. Various facts have in recent years come to my attention, such as the Lysenko case in biology and various writings and speeches of Soviet officials in the field of physics, which alone would have convinced me, quite aside from the much larger amount of evidence in other fields, that Russian Communism does not mix well with the spirit of science and humane social outlook. There is no reason to suppose that the type of thought control exercised by the Russian government in the sciences is not also exercised by them in all the activities of the Russian people. Their present form of government is thus quite evidently a thorough and brutal dictatorship. It is unthinkable that I could prefer such a form of government to our own.

William Perl

WILLIAM PERL

Note: This instrument must be notarized.

Subscribed and sworn to before
me this 15 day
of May 1950

Josephine M. Carr
Notary Public

My commission expires:

Josephine M. Carr, Notary Public

Commission Expires October 22, 1951

Julius Rosenberg Et AL.

Referral
National
Aeronautics
And Space
Administration

No. 12

APPEAL TO: MR. MITES WAGGONER
FREEDOM OF INFORMATION OFFICER
NASA HEADQUARTERS
WASHINGTON, D.C. 20546

REFERRAL

Reviewed by: Amf / sub

AGENCY National Aeronautics and Space Administration

Packet 12
Subject and File Number

Serial

Date

Document Description

No. of Pages
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1/29/54

Internal Memo
BRANNIGAN to Belmont

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Perl HQ 65-59312

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EBF TO ABOVE

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Office Memorandum • UNITED STATES GOVERNMENT

TO : MR. A. H. BELMONT *sh*
 FROM : MR. W. A. BRANTLEY *sh*
 SUBJECT: WILLIAM PERL, aka.
 ESPIONAGE - R
 PERJURY

DATE: January 24, 1952

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PURPOSE

To inform you that Mr. Robert L. Bell, Security Officer, NACA (National Advisory Committee for Aeronautics), turned over to the Bureau the attached collection of specimen tunnel data sheets as well as a budget presentation and pattern for the construction of a gas dynamics laboratory, which data was desired for the purpose of having same exhibited to Engineer Lieutenant Colonel Grigori A. Tokaev, Soviet defector in the hands of the British, for identification purposes.

To recommend that the attached letters be sent to ONI and OSI, requesting that they make available to the Bureau diagrams and descriptive information relative to the actual Ordnance Aerodynamics Laboratory at Filton and Wright Field 10 foot wind tunnel, likewise for the purpose of having same identified by Tokaev.

DETAILS

At the time of the recent interviews with Engineer Lieutenant Colonel Grigori A. Tokaev, Soviet defector in the hands of the British, he furnished considerable information concerning aeronautical materials of a classified and confidential nature which he indicated had fallen into the hands of the Soviets through their espionage set-up in this country. Among the various documents of this nature which he claims to have seen in the hands of the Soviets were what he described as original NACA data sheets, diagrams and descriptive data relative to a 10 foot or 3 meter wind tunnel used for testing jet engines and a gas dynamics type laboratory. According to Mr. John Stack, a representative of NACA who participated in the recent interviews, it was his impression that Tokaev might be in a position to positively identify certain of the NACA data sheets which he may have seen, as well as diagrams of the wind tunnel and gas aerodynamics laboratory to which Tokaev

reference. ~~SECRET~~

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EX - 67

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Attachments
 65-59312
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EX - 67

ALL INFORMATION CONTAINED
 HEREIN IS UNCLASSIFIED
 EXCEPT WHERE SHOWN
 OTHERWISE

Exempt from GDS, Category 1, 3
 Date of Declassification Indefinite
 89/6/9 4-28-78

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ENCLOSURE

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Accordingly, Mr. Robert L. Bell, Security Officer of NACA, turned over to the Bureau a collection of specimen tunnel data sheets which were official confidential records of NACA. He also made available a budget presentation pamphlet including diagrams for justification for the construction of a fluid and gas dynamics analysis laboratory which was planned by NACA but never built. Mr. Bell stated that, while this data may previously have had a confidential classification, it has since been declassified and there would be absolutely no objection to either exhibiting same to Tokaev or discussing the details thereof with him.

Mr. Bell suggested that the descriptive information, as well as diagrams of the Naval Ordnance Aerodynamics Laboratory at White Oaks could undoubtedly be secured through ONI and the similar information as to the 10 foot wind tunnel for the testing of jets could be obtained through OSI. It is therefore believed that appropriate letters should be directed to ONI and OSI, requesting them to make such information available to this Bureau and specifically indicate whether it will be satisfactory to discuss the descriptive information concerning these projects with Tokaev and exhibit the diagrams relative thereto to Tokaev for identification purposes. (S)

The afore-mentioned data records and diagrams for identification to Tokaev is being retained in the Bureau files pending the receipt of the additional information from ONI and OSI. (S)

RECOMMENDATION

It is recommended that the attached letters be directed to ONI and OSI, requesting the afore-mentioned information and data so as to enable the identification of same at the time of the next interview with Tokaev. (S)

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	1145	1146	1147	1148	1149	150	1151	1152	1153	1154	1155	1156	1157	1158	1159	1160	1161	1162	1163	1164	1165	1166	1167	1168	1169	1170	1171	1172	1173	1174	1175	1176	1177	1178	1179	1180	1181	1182	1183	1184	1185	1186	1187	1188	1189	1190	1191	1192	1193	1194	1195	1196	1197	1198	1199	1200	1201	1202	1203	1204	1205	1206	1207	1208	1209	1210	1211	1212	1213	1214	1215	1216	1217	1218	1219	1220	1221	1222	1223	1224	1225	1226	1227	1228	1229	1230	1231	1232	1233	1234	1235	1236	1237	1238	1239	1240	1241	1242	1243	1244	1245	1246	1247	1248	1249	1250	1251	1252	1253	1254	1255	1256	1257	1258	1259	1260	1261	1262	1263	1264	1265	1266	1267	1268	1269	1270	1271	1272	1273	1274	1275	1276	1277	1278	1279	1280	1281	1282	1283	1284	1285	1286	1287	1288	1289	1290	1291	1292	1293	1294	1295	1296	1297	1298	1299	1300	1301	1302	1303	1304	1305	1306	1307	1308	1309	1310	1311	1312	1313	1314	1315	1316	1317	1318	1319	1320	1321	1322	1323	1324	1325	1326	1327	1328	1329	1330	1331	1332	1333	1334	1335	1336	1337	1338	1339	1340	1341	1342	1343	1344	1345	1346	1347	1348	1349	1350	1351	1352	1353	1354	1355	1356	1357	1358	1359	1360	1361	1362	1363	1364	1365	1366	1367	1368	1369	1370	1371	1372	1373	1374	1375	1376	1377	1378	1379	1380	1381	1382	1383	1384	1385	1386	1387	1388	1389	1390	1391	1392	1393	1394	1395	1396	1397	1398	1399	1400	1401	1402	1403	1404	1405	1406	1407	1408	1409	1410	1411	1412	1413	1414	1415	1416	1417	1418	1419	1420	1421	1422	1423	1424	1425	1426	1427	1428	1429	1430	1431	1432	1433	1434	1435	1436	1437	1438	1439	1440	1441	1442	1443	1444	1445	1446	1447	1448	1449	1450	1451	1452	1453	1454	1455	1456	1457	1458	1459	1460	1461	1462	1463	1464	1465	1466	1467	1468	1469	1470	1471	1472	1473	1474	1475	1476	1477	1478	1479	1480	1481	1482	1483	1484	1485	1486	1487	1488	1489	1490	1491	1492	1493	1494	1495	1496	1497	1498	1499	1500	1501	1502	1503	1504	1505	1506	1507	1508	1509	1510	1511	1512	1513	1514	1515	1516	1517	1518	1519	1520	1521	1522	1523	1524	1525	1526	1527	1528	1529	1530	1531	1532	1533	1534	1535	1536	1537	1538	1539	1540	1541	1542	1543	1544	1545	1546	1547	1548	1549	1550	1551	1552	1553	1554	1555	1556	1557	1558	1559	1560	1561	1562	1563	1564	1565	1566	1567	1568	1569	1570	1571	1572	1573	1574	1575	1576	1577	1578	1579	1580	1581	1582	1583	1584	1585	1586	1587	1588	1589	1590	1591	1592	1593	1594	1595	1596	1597	1598	1599	1600	1601	1602	1603	1604	1605	1606	1607	1608	1609	1610	1611	1612	1613	1614	1615	1616	1617	1618	1619	1620	1621	1622	1623	1624	1625	1626	1627	1628	1629	1630	1631	1632	1633	1634	1635	1636	1637	1638	1639	1640	1641	1642	1643	1644	1645	1646	1647	1648	1649	1650	1651	1652	1653	1654	1655	1656	1657	1658	1659	1660	1661	1662	1663	1664	1665	1666	1667	1668	1669	1670	1671	1672	1673	1674	1675	1676	1677	1678	1679	1680	1681	1682	1683	1684	1685	1686	1687	1688	1689	1690	1691	1692	1693	1694	1695	1696	1697	1698	1699	1700	1701	1702	1703	1704	1705	1706	1707	1708	1709	1710	1711	1712	1713	1714	1715	1716	1717	1718	1719	1720	1721	1722	1723	1724	1725	1726	1727	1728	1729	1730	1731	1732	1733	1734	1735	1736	1737	1738	1739	1740	1741	1742	1743	1744	1745	1746	1747	1748	1749	1750	1751	1752	1753	1754	1755	1756	1757	1758	1759	1760	1761	1762	1763	1764	1765	1766	1767	1768	1769	1770	1771	1772	1773	1774	1775	1776	1777	1778	1779	1780	1781	1782	1783	1784	1785	1786	1787	1788	1789	1790	1791	1792	1793	1794	1795	1796	1797	1798	1799	1800	1801	1802	1803	1804	1805	1806	1807	1808	1809	1810	1811	1812	1813	1814	1815	1816	1817	1818	1819	1820	1821	1822	1823	1824	1825	1826	1827	1828	1829	1830	1831	1832	1833	1834	1835	1836	1837	1838	1839	1840	1841	1842	1843	1844	1845	1846	1847	1848	1849	1850	1851	1852	1853	1854	1855	1856	1857	1858	1859	1860	1861	1862	1863	1864	1865	1866	1867	1868	1869	1870	1871	1872	1873	1874	1875	1876	1877	1878	1879	1880	1881	1882	1883	1884	1885	1886	1887	1888	1889	1890	1891	1892	1893	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	2101	2102	2103	2104	2105	2106	2107	2108	2109	2110	2111	2112	2113	2114	2115	2116	2117	2118	2119	2120	2121	2122	2123	2124	2125	2126	2127	2128	2129	2130	2131	2132	2133	2134	2135	2136	2137	2138	2139	2140	2141	2142	2143	2144	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Test Notes

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Building Your AC Program

Test Bank

[illegible]

9

[illegible]

TEST No.

Date

	13	14	15	16	17	18	19	20	21	22	23
1	Comp T-10	Comp T-10	Turb Outlet	NACA Turb Outlet	NACA Turb Outlet	Exh Inlet	Exh Outlet				
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C. 801 (Revised 2-3-49)

(73-84)

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Test No.		Date		Time		Name	
1	2	3	4	5	6	7	8
116	8a	8	0	0	R	1	1
117	8a	8	0	0	R	1	1
118	8a	8	0	0	R	1	1
119	8a	8	0	0	R	1	1
120	8a	8	0	0	R	1	1
121	8a	8	0	0	R	1	1
122	8a	8	0	0	R	1	1
123	8a	8	0	0	R	1	1
124	8a	8	0	0	R	1	1
125	8a	8	0	0	R	1	1
126	8a	8	0	0	R	1	1
127	8a	8	0	0	R	1	1
128	8a	8	0	0	R	1	1
129	8a	8	0	0	R	1	1
130	8a	8	0	0	R	1	1
131	8a	8	0	0	R	1	1
132	8a	8	0	0	R	1	1
133	8a	8	0	0	R	1	1
134	8a	8	0	0	R	1	1
135	8a	8	0	0	R	1	1
136	8a	8	0	0	R	1	1
137	8a	8	0	0	R	1	1
138	8a	8	0	0	R	1	1
139	8a	8	0	0	R	1	1
140	8a	8	0	0	R	1	1
141	8a	8	0	0	R	1	1
142	8a	8	0	0	R	1	1
143	8a	8	0	0	R	1	1
144	8a	8	0	0	R	1	1
145	8a	8	0	0	R	1	1
146	8a	8	0	0	R	1	1
147	8a	8	0	0	R	1	1
148	8a	8	0	0	R	1	1
149	8a	8	0	0	R	1	1
150	8a	8	0	0	R	1	1
151	8a	8	0	0	R	1	1
152	8a	8	0	0	R	1	1
153	8a	8	0	0	R	1	1
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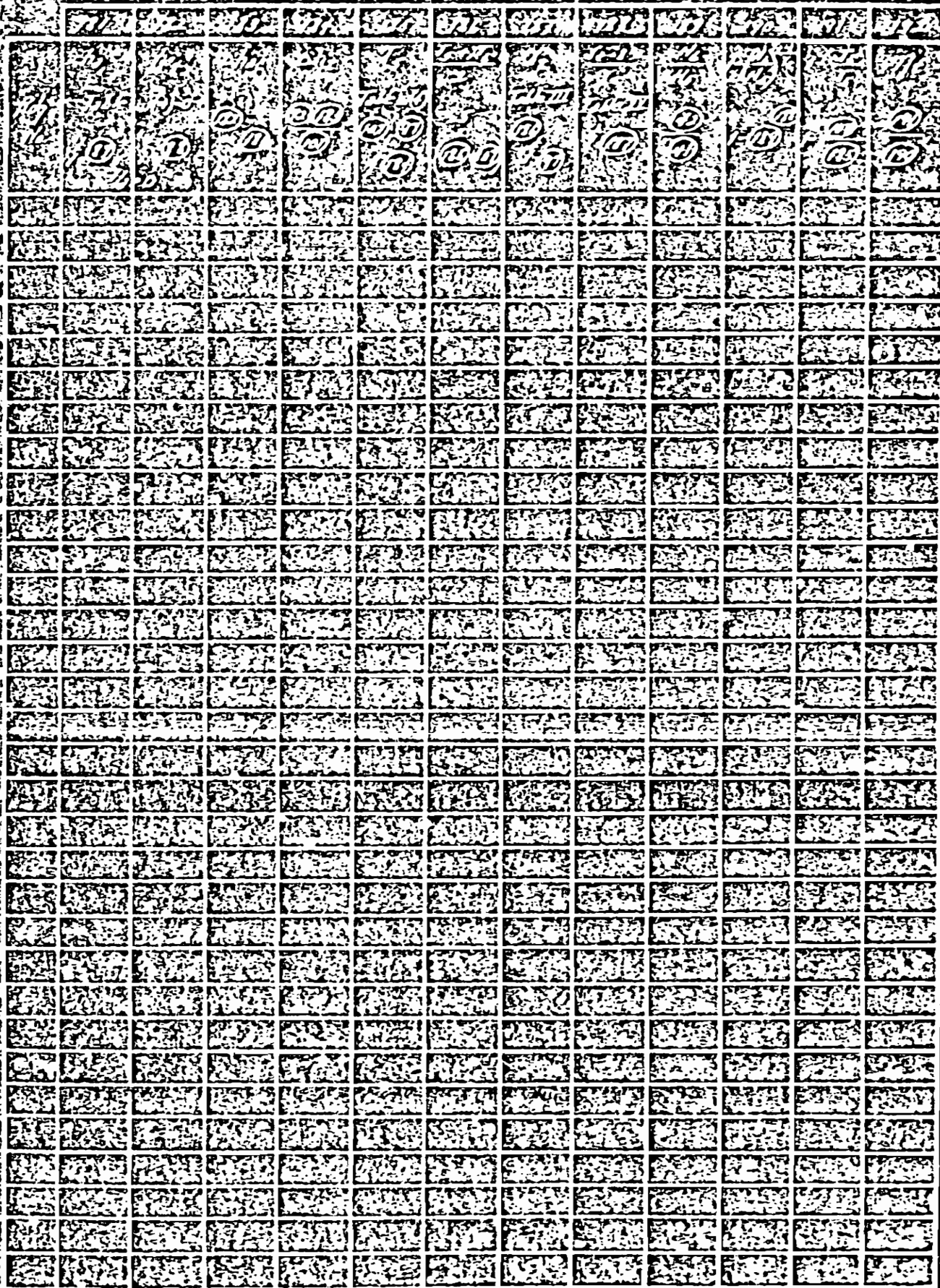
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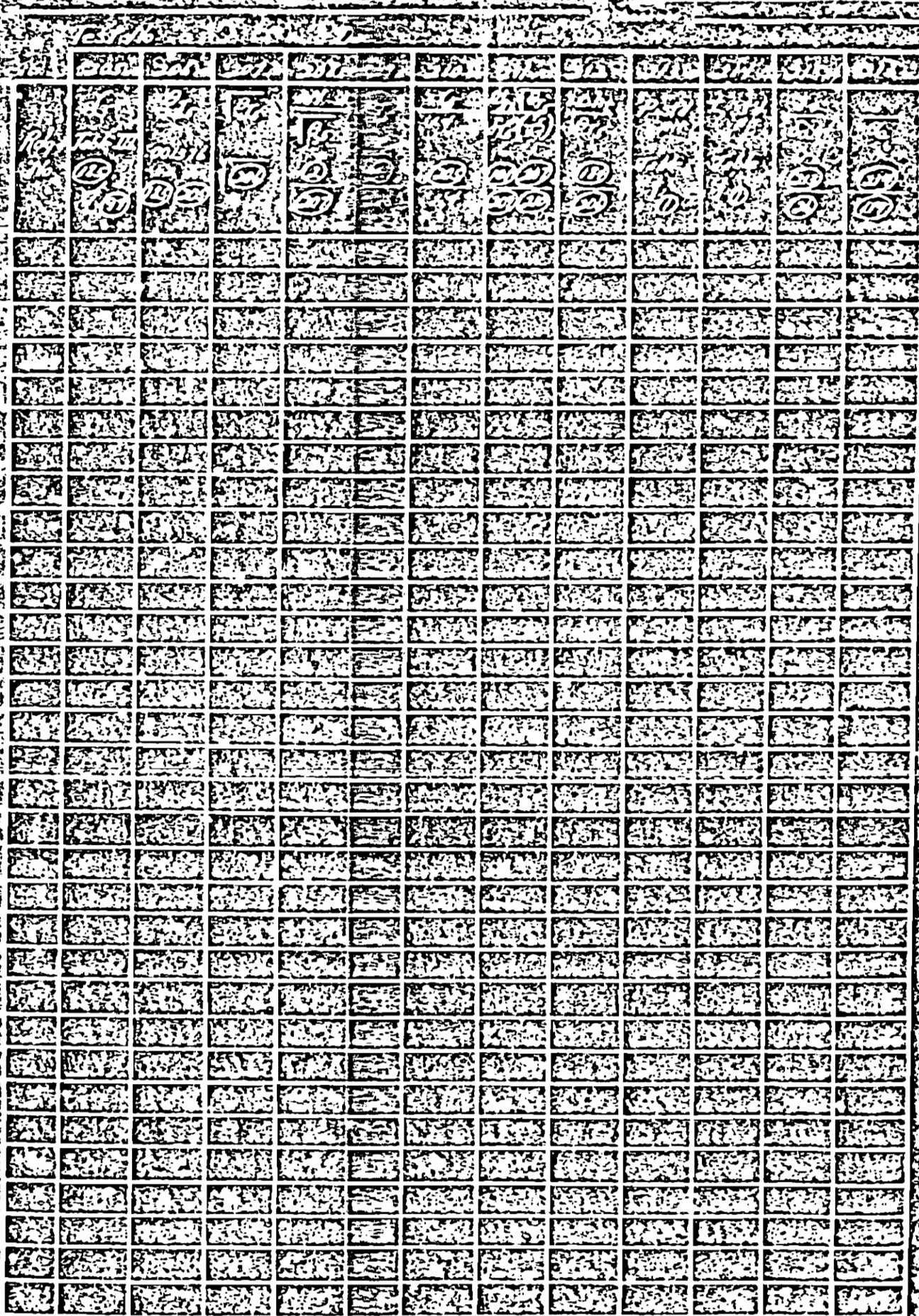
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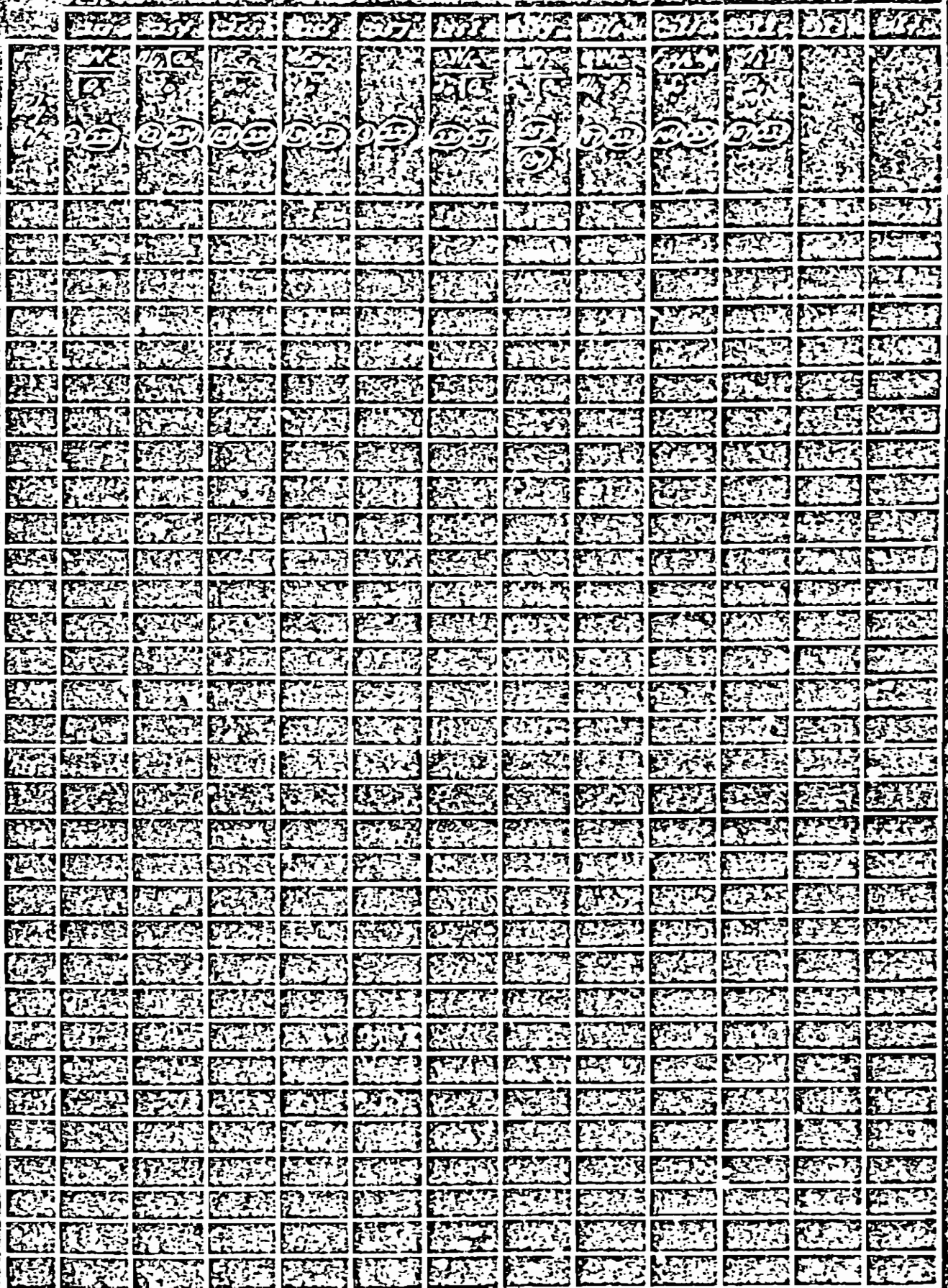
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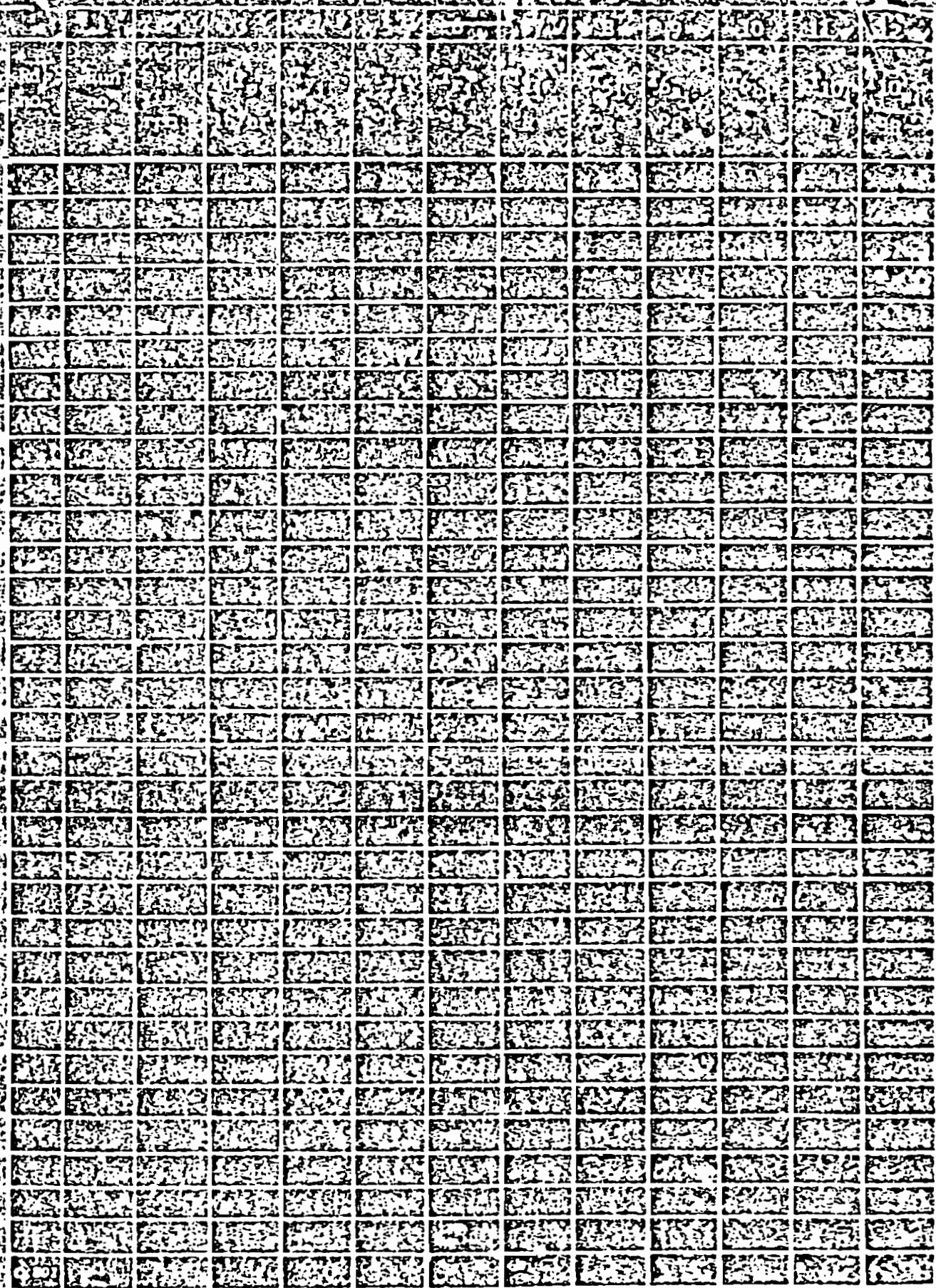


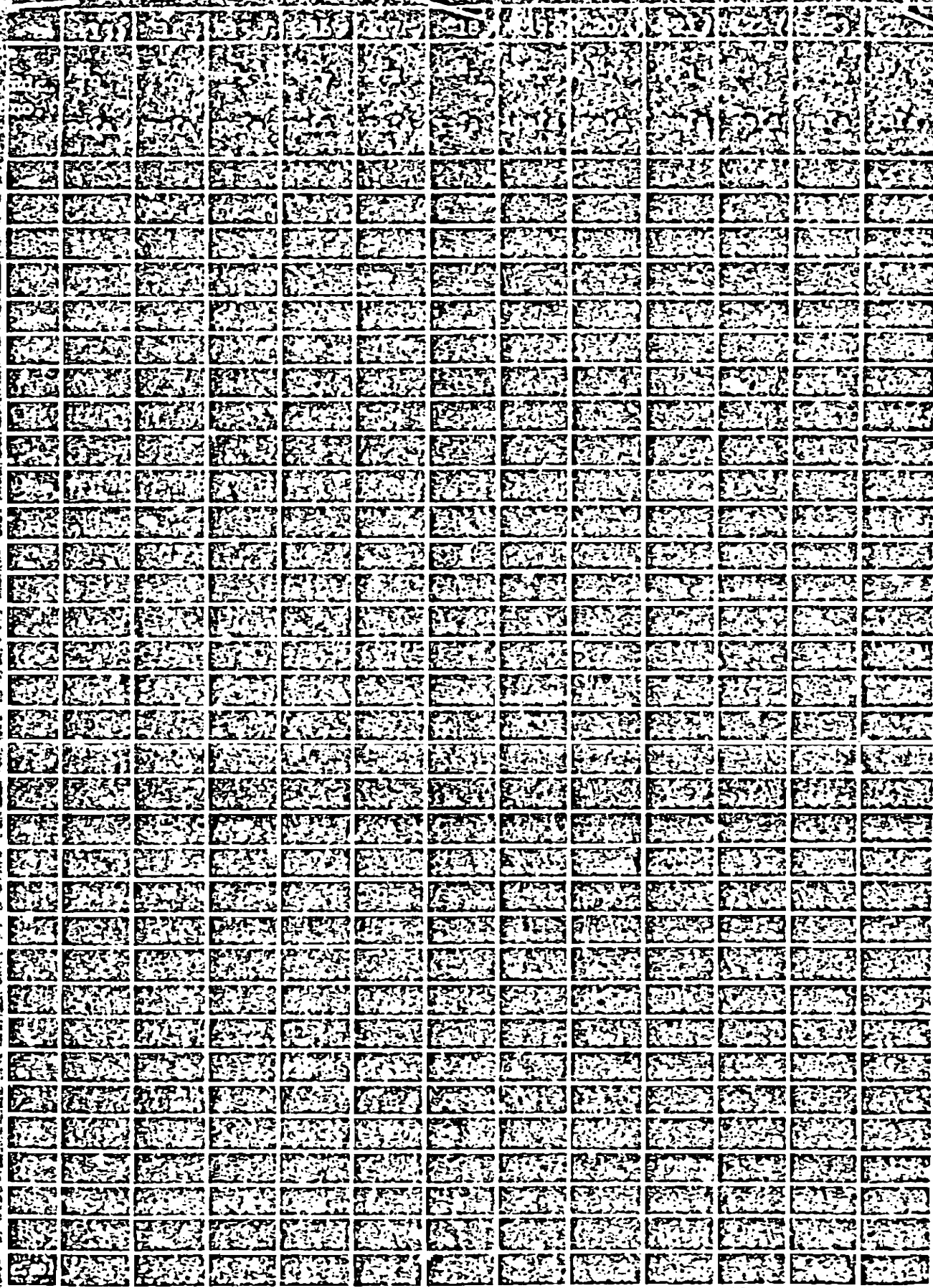
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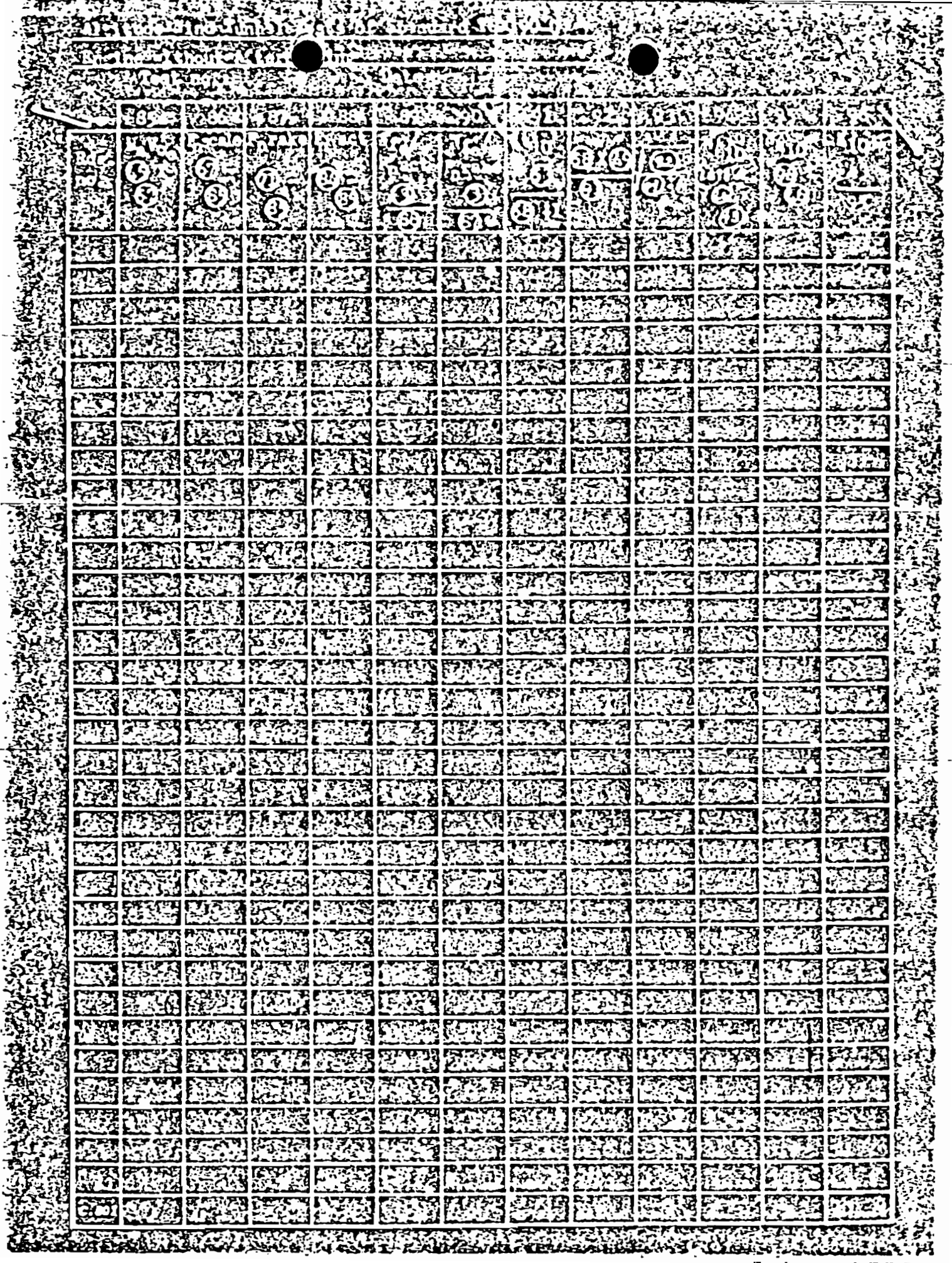




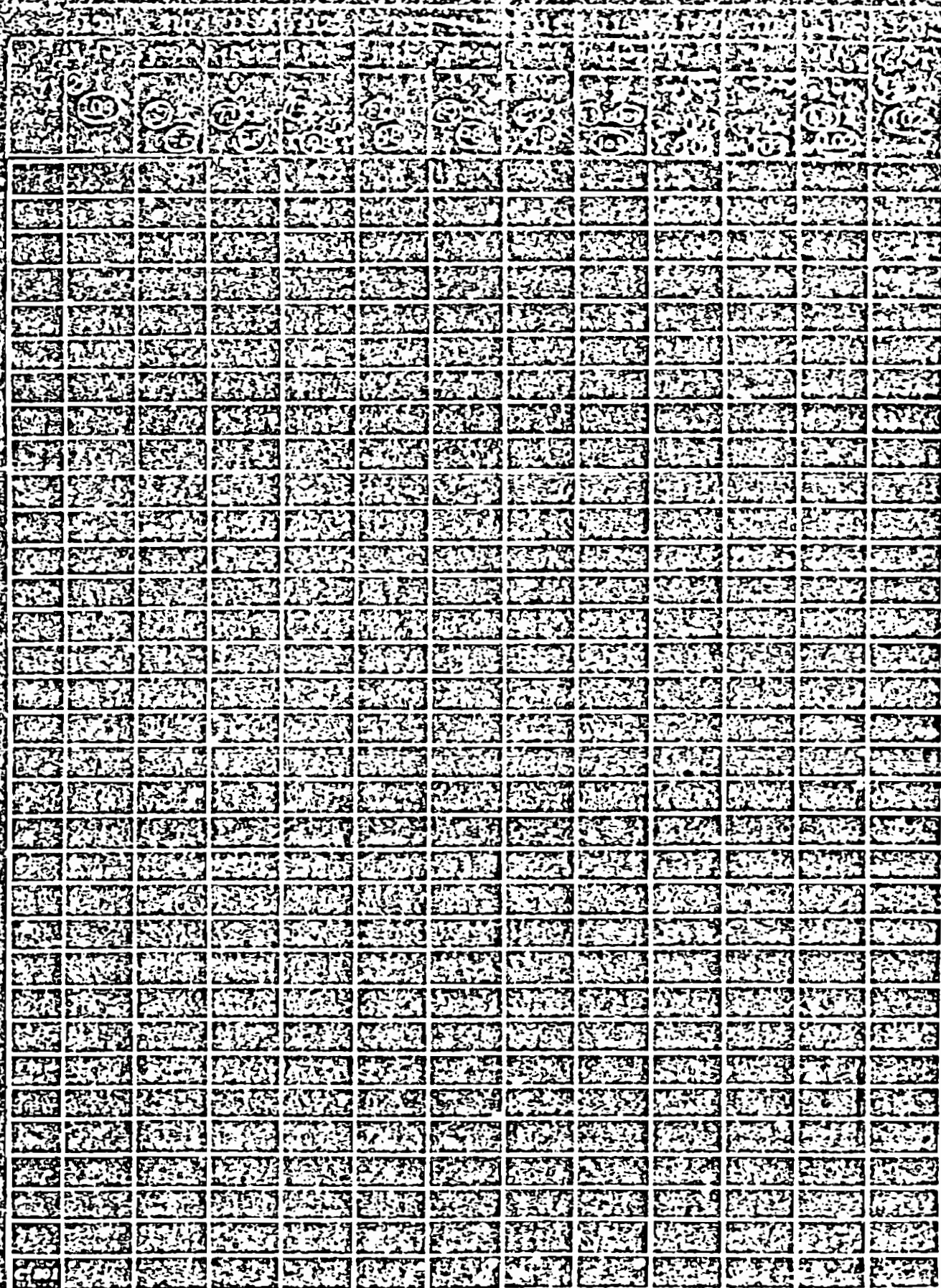
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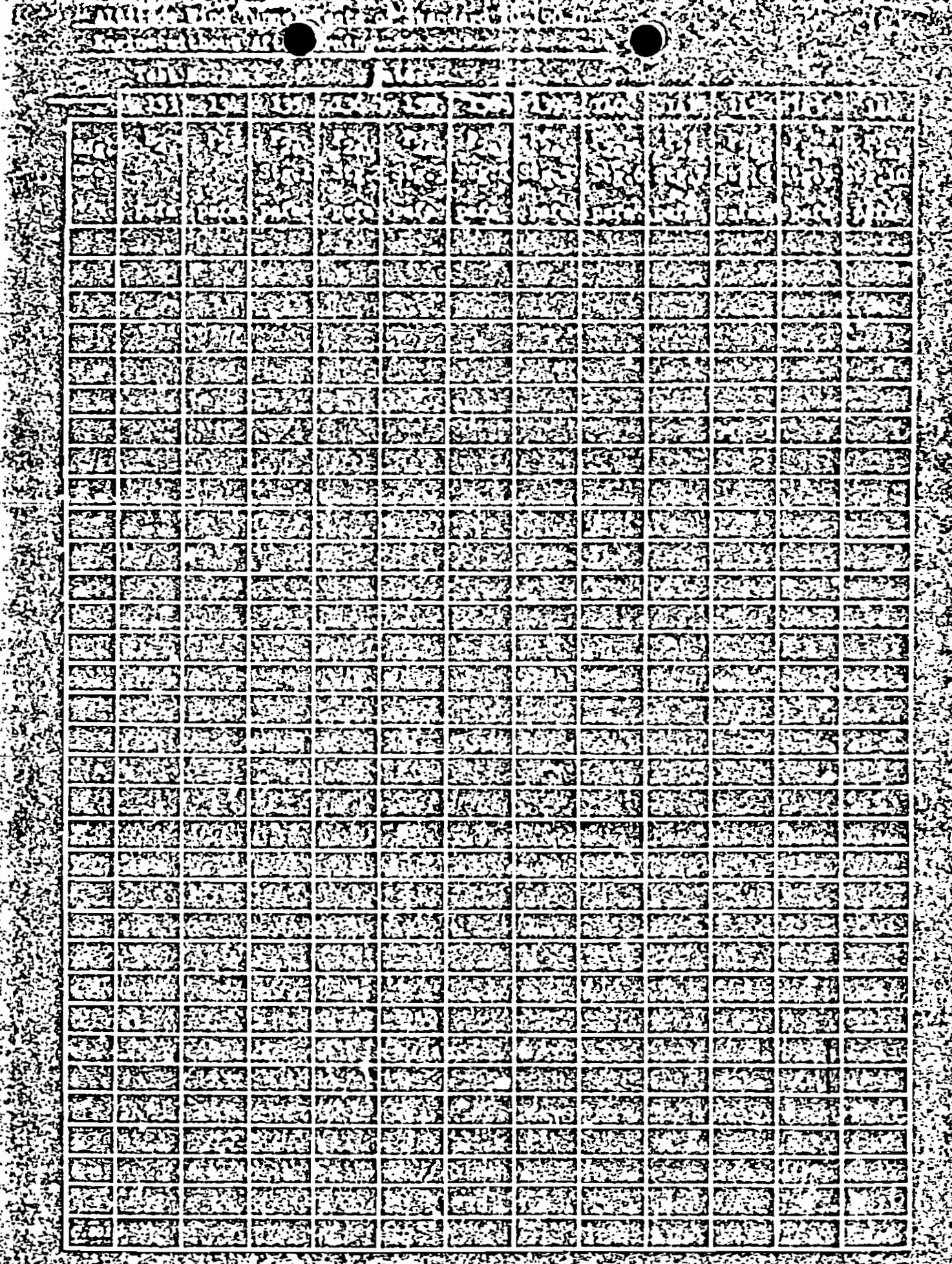
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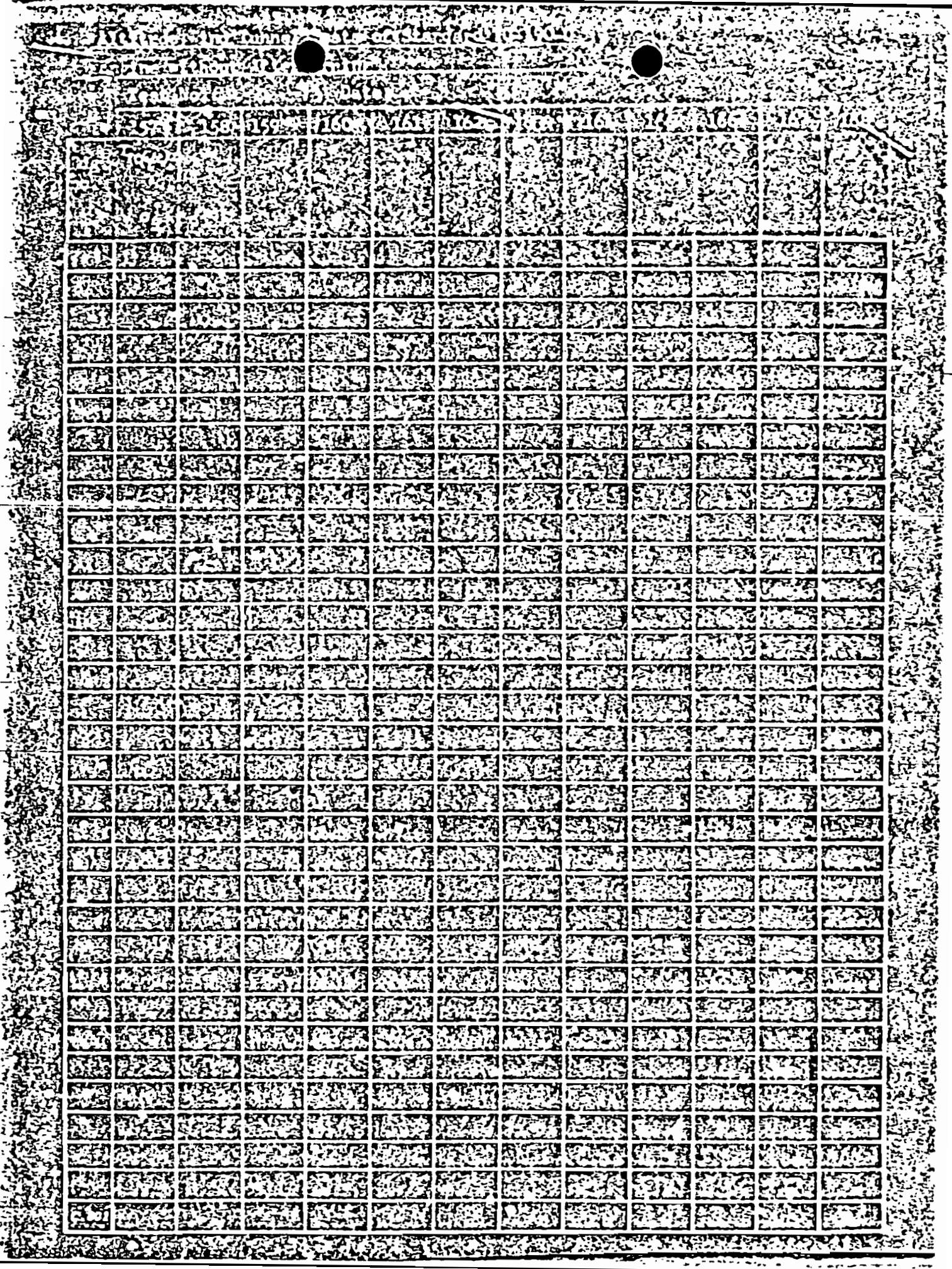
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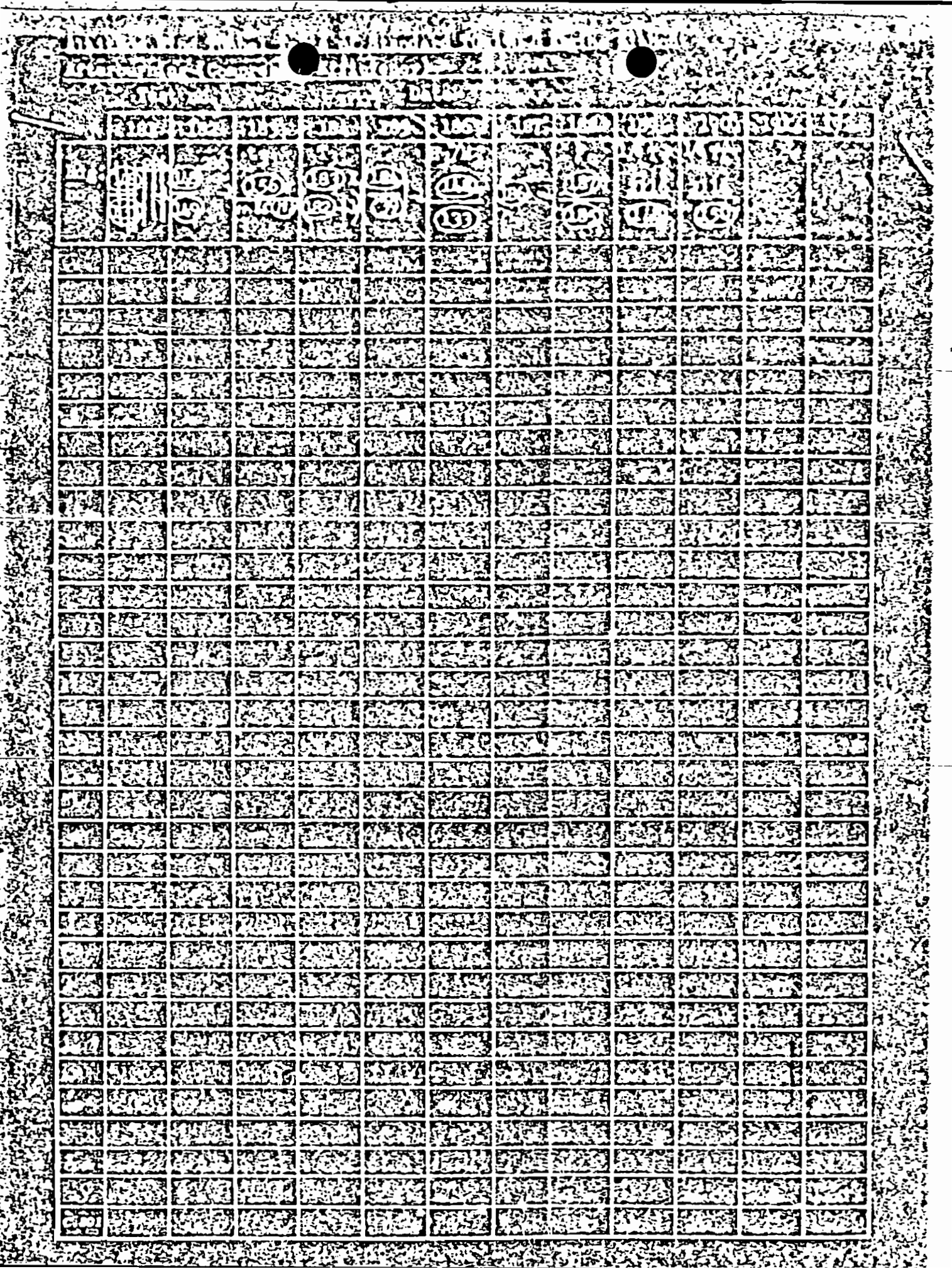
中国书画函授大学肇庆分校

THE UNIVERSITY OF CHICAGO

[illegible]



A 20x20 grid of 400 small, square images. Each image contains a different pattern of black and white noise or static, resembling a random distribution of pixels. The patterns vary significantly across the grid, with some showing more horizontal streaks, others more vertical, and many showing a mix of random noise. The overall effect is a dense, textured mosaic of random patterns.



Continued

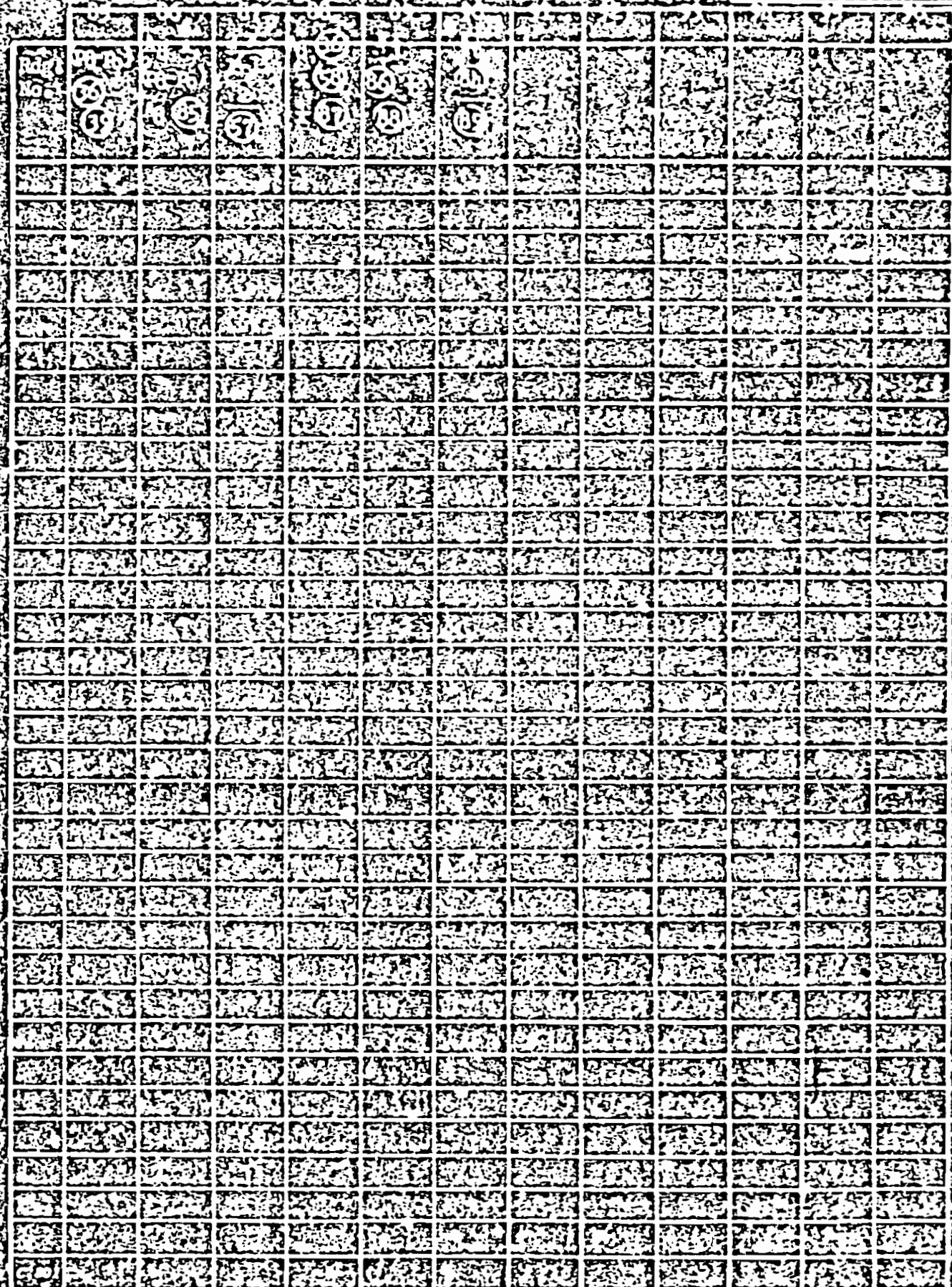
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100-100000

(10)

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100-100000 (11)

100-100000 (12)

100-100000 (13)

100-100000 (14)

	100	200	300	400	500	600	700	800	900	1000	1100	1200
100	100	200	300	400	500	600	700	800	900	1000	1100	1200
200	200	400	600	800	1000	1200	1400	1600	1800	2000	2200	2400
300	300	600	900	1200	1500	1800	2100	2400	2700	3000	3300	3600
400	400	800	1200	1600	2000	2400	2800	3200	3600	4000	4400	4800
500	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000
600	600	1200	1800	2400	3000	3600	4200	4800	5400	6000	6600	7200
700	700	1400	2100	2800	3500	4200	4900	5600	6300	7000	7700	8400
800	800	1600	2400	3200	4000	4800	5600	6400	7200	8000	8800	9600
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1000	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000
1100	1100	2200	3300	4400	5500	6600	7700	8800	9900	11000	12100	13200
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2200	2200	4400	6600	8800	11000	13200	15300	17400	19500	21600	23700	25800
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6900	6900	13800	20700	27600	34500	41400	43500	45600	47700	49800	51900	54000
7000	7000	14000	21000	28000	35000	42000	44100	46200	48300	50400	52500	54600
7100	7100	14200	21300	28400	35500	42600	44700	46800	48900	51000	53100	55200
7200	7200	14400	21600	28800	36000	43200	45300	47400	49500	51600	53700	55800
7300	7300	14600	21900	29200	36500	43800	45900	48000	50100	52200	54300	56400
7400	7400	14800	22200	29600	37000	44400	46500	48600	50700	52800	54900	57000
7500	7500	15000	22500	30000	37500	45000	47100	49200	51300	53400	55500	57600
7600	7600	15200	22800	30400	38000	45600	47700	49800	51900	54000	56100	58200
7700	7700	15400	23100	30800	38500	46200	48300	50400	52500	54600	56700	58800
7800	7800	15600	23400	31200	39000	46800	48900	51000	53100	55200	57300	59400
7900	7900	15800	23700	31600	39500	47400	49500	51600	53700	55800	57900	60000
8000	8000	16000	24000	32000	40000	48000	50100	52200	54300	56400	58500	60600
8100	8100	16200	24300	32400	40500	48600	50700	52800	54900	57000	59100	61200
8200	8200	16400	24600	32800	41000	49200	51300	53400	55500	57600	59700	61800
8300	8300	16600	24900	33200	41500	49800	51900	54000	56100	58200	60300	62400
8400	8400	16800	25200	33600	42000	50400	52500	54600	56700	58800	60900	63000
8500	8500	17000	25500	34000	42500	51000	53100	55200	57300	59400	61500	63600
8600	8600	17200	25800	34400	43000	51600	53700	55800	57900	59700	62100	64200
8700	8700	17400	26100	34800	43500	52200	54300	56400	58500	60300	62700	64800
8800	8800	17600	26400	35200	44000	52800	54900	57000	59100	60900	63300	65400
8900	8900	17800	26700	35600	44500	53400	55500	57600	59700	61500	63900	66000
9000	9000	18000	27000	36000	45000	54000	56100	58200	60300	62100	64500	66600
9100	9100	18200	27300	36400	45500	54600	56700	58800	60900	62700	65100	67200
9200	9200	18400	27600	36800	46000	55200	57300	59400	61500	63300	65700	67800
9300	9300	18600	27900	37200	46500	55800	57900	60000	62100	63900	66300	68400
9400	9400											

[illegible]

Spinning

57

[illegible]

[illegible]

[illegible]

Test 5 No.

[illegible]

[illegible]

Column
No.

Remarks

①

111 Flight Recorder No. 1, range of thermocouples
1-1-2 through 1-7

②

E₁ Average of tubes 111 thru 112

③

P₁ Average of tubes 117 thru 118

④

221 Flight Recorder No. 1, range of thermocouples
1-8 through 2-1

⑤

12 (NACA) Average of tubes 1 through 19

⑥

12 (NACA) Average of tubes 15 thru 19

⑦

P₂ Average of tubes 110 thru 111

⑧

P₃ stage 1, tube 115

⑨

P₄ stage 2, tube 120

⑩

P₅ stage 3, tube 101

⑪

P₆ stage 4, tube 116

⑫

P₇ stage 5, tube 115

100

Dat

Competition

Dat[illegible]

Column
No. 8

Remarks

(7)

32.2 = E

(7)

603 = E/R = A₁ = 5

(7)

2116 = sea level static pressure

(7)

519 = sea level temperature

Find a

CONFIDENTIAL

[illegible]

Column
Tr No.

Remarks

- (1) P₁ stage 6, tube 14
- (12) P₁ stage 7, tube 17
- (15) P₁ stage 8, tube 18
- (16) P₁ stage 9, tube 19
- (17) P₁ stage 10, tube 110
- (18) P₁ stage 11, tube 111
- (19) T₁₀ (NACb) Flight Recorder 10, 1, average of thermocouples 2-2 through 2-11
- (20) T₁₁ (NACb) Flight Recorder 10, 1, average of thermocouples 2-2 through 2-11
- (21) T₁₂ (NACb) average of tubes 112 through 126
- (22) T₁₃ (NACb) average of tubes 127 through 139
- (23) T₁₄ (NACb) average of tubes 140 through 154

Discussion

[illegible]

Column
No.

Remarks

(25)

12 (NCA) average of tubes 1116 through 1118

(26)

12 (NCO) average of tubes 1111 through 1113

(27)

12 stage 1 average of tubes 1116 through 1118

(28)

12 stage 2 average of tubes 1119 through 1121

(29)

12 (NCA) Flight Recorder No. 3 average of thermo-couples 5-8 through 5-10 and 5-6 through 5-7

(30)

12 (NCO) Flight Recorder No. 3 average of thermo-couples 5-8 through 5-10

(31)

12 (NCA) average of tubes 1151 through 1153

(32)

12 (NCO) tube 1162

(33)

12 average of tubes 1163 through 1165

(34)

12 Flight Recorder No. 3 start 1101-2 through 1103

(35)

12 average of tubes 1271 through 1273

(36)

12 average of tubes 1291 through 1293

Flight Recorder No. 3 indicates number of tubes to be averaged

Column
No.

Remarks

(57)

P_0 Average of 11 columns operating at 1000
140000 lb. constant S_0

(58)

11 tubes 1157

(59)

P_0 Average of tubes 1151 - 1160

(60)

$286 = \frac{1157}{7}$

(61)

$16718 = \sqrt{SE \cdot 10^6}$

(62)

$C = 2 \sqrt{SE}$ column (1)

(63)

$P_0 = 1000$ column (1)

[illegible]

Sheet

Column No.

Remarks

(19)

$$286 = \frac{f \cdot L}{\gamma}$$

(20)

0.85 = thermocouple impact recovery factor

(21)

$$2.06 = \sqrt{2 \cdot g \cdot c_p / R \cdot T \cdot A}$$

(22)

From Ch10 of copy of panel data sheet mnt

Sheet 6 of 10

Column
No.

Remarks

63

$$1.10 = \sqrt{2.0 \times 1.1} \times 1.1$$

64

Ratio on down installation to full rate dir. for

65

$$286 = \frac{1}{1.1}$$

66

$$10918 = \sqrt{2.0 \times 1.1} \times 1.1$$

67

68

[illegible]

ALL INFORMATION CONTAINED HEREIN IS UNCLASSIFIED

THE UNIVERSITY OF CHICAGO

Total Value of Assets: \$10,769,841

[illegible]

TEST NO. 2

DATA

C.001 REVISED 2-3-49

C-8014 (REVISED 2-3-49)

C. 8014 (REVISED 2-3-49)

	61	62	63	64	65	66	67	68	69	70	71	72
Rdg. No.	H CL	P CL	T TL	B TB	F TO	C TC	M RB	D RB	S C	L S	A L	E E
	pafa	pafg	pfae	pafb	pafd	pafc	pafe	pafv				

1998

Date: 11/11/2011

C-501 (Rev. 5-20-49)

Calculated Air Temperatures

[illegible]

De

Abstract

Date _____

CJ 8014 (Revisão 253.49)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260	261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300	301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360	361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380	381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480	481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500	501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520	521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540	541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560	561	562	563	564	565	566	567	568	569	570	571	572	573	574	575	576	577	578	579	580	581	582	583	584	585	586	587	588	589	590	591	592	593	594	595	596	597	598	599	600	601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620	621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640	641	642	643	644	645	646	647	648	649	650	651	652	653	654	655	656	657	658	659	660	661	662	663	664	665	666	667	668	669	670	671	672	673	674	675	676	677	678	679	680	681	682	683	684	685	686	687	688	689	690	691	692	693	694	695	696	697	698	699	700	701	702	703	704	705	706	707	708	709	710	711	712	713	714	715	716	717	718	719	720	721	722	723	724	725	726	727	728	729	730	731	732	733	734	735	736	737	738	739	740	741	742	743	744	745	746	747	748	749	750	751	752	753	754	755	756	757	758	759	760	761	762	763	764	765	766	767	768	769	770	771	772	773	774	775	776	777	778	779	780	781	782	783	784	785	786	787	788	789	790	791	792	793	794	795	796	797	798	799	800	801	802	803	804	805	806	807	808	809	810	811	812	813	814	815	816	817	818	819	820	821	822	823	824	825	826	827	828	829	830	831	832	833	834	835	836	837	838	839	840	841	842	843	844	845	846	847	848	849	850	851	852	853	854	855	856	857	858	859	860	861	862	863	864	865	866	867	868	869	870	871	872	873	874	875	876	877	878	879	880	881	882	883	884	885	886	887	888	889	890	891	892	893	894	895	896	897	898	899	900	901	902	903	904	905	906	907	908	909	910	911	912	913	914	915	916	917	918	919	920	921	922	923	924	925	926	927	928	929	930	931	932	933	934	935	936	937	938	939	940	941	942	943	944	945	946	947	948	949	950	951	952	953	954	955	956	957	958	959	960	961	962	963	964	965	966	967	968	969	970	971	972	973	974	975	976	977	978	979	980	981	982	983	984	985	986	987	988	989	990	991	992	993	994	995	996	997	998	999	1000
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De la R

15C 891 (REV) 15012-3-49)

19 OF AESTHETICS

Compressor, Turbine, and Combustion Efficiency

Date

[illegible]

17 岁

●

Date:

C-001 (REVISED 2-3-49)

Test No. 1

Date

	194	195	196	197	198	199	200	201	202	203	204
1	1/2	1/3	$\sqrt{2}$	1/4	1/5	$\sqrt{3}$	1/6	$\sqrt{1/2}$	1/10	1/11	1/12
2	1/8	1/9	$\sqrt{3}$	1/16	1/25	$\sqrt{5}$	1/10	1/11	1/12	1/13	1/14
3	1/16	1/25	$\sqrt{5}$	1/36	1/49	$\sqrt{7}$	1/14	1/15	1/16	1/17	1/18
4	1/25	1/36	$\sqrt{7}$	1/49	1/64	$\sqrt{11}$	1/16	1/17	1/18	1/19	1/20
5	1/36	1/49	$\sqrt{11}$	1/64	1/81	$\sqrt{13}$	1/18	1/19	1/20	1/21	1/22
6	1/49	1/64	$\sqrt{13}$	1/81	1/100	$\sqrt{17}$	1/20	1/21	1/22	1/23	1/24
7	1/64	1/81	$\sqrt{17}$	1/100	1/121	$\sqrt{19}$	1/22	1/23	1/24	1/25	1/26
8	1/81	1/100	$\sqrt{19}$	1/121	1/144	$\sqrt{23}$	1/24	1/25	1/26	1/27	1/28
9	1/100	1/121	$\sqrt{23}$	1/144	1/169	$\sqrt{29}$	1/26	1/27	1/28	1/29	1/30
10	1/121	1/144	$\sqrt{29}$	1/169	1/196	$\sqrt{31}$	1/28	1/29	1/30	1/31	1/32
11	1/144	1/169	$\sqrt{31}$	1/196	1/225	$\sqrt{37}$	1/30	1/31	1/32	1/33	1/34
12	1/169	1/196	$\sqrt{37}$	1/225	1/256	$\sqrt{41}$	1/32	1/33	1/34	1/35	1/36
13	1/196	1/225	$\sqrt{41}$	1/256	1/289	$\sqrt{43}$	1/34	1/35	1/36	1/37	1/38
14	1/225	1/256	$\sqrt{43}$	1/289	1/324	$\sqrt{47}$	1/36	1/37	1/38	1/39	1/40
15	1/256	1/289	$\sqrt{47}$	1/324	1/361	$\sqrt{53}$	1/38	1/39	1/40	1/41	1/42
16	1/289	1/324	$\sqrt{53}$	1/361	1/400	$\sqrt{59}$	1/40	1/41	1/42	1/43	1/44
17	1/324	1/361	$\sqrt{59}$	1/400	1/441	$\sqrt{61}$	1/42	1/43	1/44	1/45	1/46
18	1/361	1/400	$\sqrt{61}$	1/441	1/484	$\sqrt{67}$	1/44	1/45	1/46	1/47	1/48
19	1/400	1/441	$\sqrt{67}$	1/484	1/529	$\sqrt{71}$	1/46	1/47	1/48	1/49	1/50
20	1/441	1/484	$\sqrt{71}$	1/529	1/576	$\sqrt{73}$	1/48	1/49	1/50	1/51	1/52
21	1/484	1/529	$\sqrt{73}$	1/576	1/625	$\sqrt{79}$	1/50	1/51	1/52	1/53	1/54
22	1/529	1/576	$\sqrt{79}$	1/625	1/676	$\sqrt{83}$	1/52	1/53	1/54	1/55	1/56
23	1/576	1/625	$\sqrt{83}$	1/676	1/729	$\sqrt{89}$	1/54	1/55	1/56	1/57	1/58
24	1/625	1/676	$\sqrt{89}$	1/729	1/784	$\sqrt{97}$	1/56	1/57	1/58	1/59	1/60
25	1/676	1/729	$\sqrt{97}$	1/784	1/841	$\sqrt{101}$	1/58	1/59	1/60	1/61	1/62
26	1/729	1/784	$\sqrt{101}$	1/841	1/900	$\sqrt{103}$	1/60	1/61	1/62	1/63	1/64
27	1/784	1/841	$\sqrt{103}$	1/900	1/961	$\sqrt{107}$	1/62	1/63	1/64	1/65	1/66
28	1/841	1/900	$\sqrt{107}$	1/961	1/1024	$\sqrt{113}$	1/64	1/65	1/66	1/67	1/68
29	1/900	1/961	$\sqrt{113}$	1/1024	1/1089	$\sqrt{119}$	1/66	1/67	1/68	1/69	1/70
30	1/961	1/1024	$\sqrt{119}$	1/1089	1/1156	$\sqrt{127}$	1/68	1/69	1/70	1/71	1/72
31	1/1024	1/1089	$\sqrt{127}$	1/1156	1/1225	$\sqrt{131}$	1/70	1/71	1/72	1/73	1/74
32	1/1089	1/1156	$\sqrt{131}$	1/1225	1/1296	$\sqrt{137}$	1/72	1/73	1/74	1/75	1/76
33	1/1156	1/1225	$\sqrt{137}$	1/1296	1/1369	$\sqrt{143}$	1/74	1/75	1/76	1/77	1/78
34	1/1225	1/1296	$\sqrt{143}$	1/1369	1/1444	$\sqrt{149}$	1/76	1/77	1/78	1/79	1/80
35	1/1296	1/1369	$\sqrt{149}$	1/1444	1/1521	$\sqrt{157}$	1/78	1/79	1/80	1/81	1/82
36	1/1369	1/1444	$\sqrt{157}$	1/1521	1/1584	$\sqrt{163}$	1/80	1/81	1/82	1/83	1/84
37	1/1444	1/1521	$\sqrt{163}$	1/1584	1/1649	$\sqrt{167}$	1/82	1/83	1/84	1/85	1/86
38	1/1521	1/1584	$\sqrt{167}$	1/1649	1/1716	$\sqrt{173}$	1/84	1/85	1/86	1/87	1/88
39	1/1584	1/1649	$\sqrt{173}$	1/1716	1/1781	$\sqrt{179}$	1/86	1/87	1/88	1/89	1/90
40	1/1649	1/1716	$\sqrt{179}$	1/1781	1/1849	$\sqrt{187}$	1/88	1/89	1/90	1/91	1/92
41	1/1716	1/1781	$\sqrt{187}$	1/1849	1/1924	$\sqrt{191}$	1/90	1/91	1/92	1/93	1/94
42	1/1781	1/1849	$\sqrt{191}$	1/1924	1/1996	$\sqrt{197}$	1/92	1/93	1/94	1/95	1/96
43	1/1849	1/1924	$\sqrt{197}$	1/1996	1/2073	$\sqrt{203}$	1/94	1/95	1/96	1/97	1/98
44	1/1924	1/1996	$\sqrt{203}$	1/2073	1/2150	$\sqrt{209}$	1/96	1/97	1/98	1/99	1/100
45	1/1996	1/2073	$\sqrt{209}$	1/2150	1/2225	$\sqrt{215}$	1/98	1/99	1/100		
46	1/2073	1/2150	$\sqrt{215}$	1/2225	1/2304	$\sqrt{221}$					
47	1/2150	1/2225	$\sqrt{221}$	1/2304	1/2381	$\sqrt{227}$					
48	1/2225	1/2304	$\sqrt{227}$	1/2381	1/2464	$\sqrt{233}$					
49	1/2304	1/2381	$\sqrt{233}$	1/2464	1/2549	$\sqrt{239}$					
50	1/2381	1/2464	$\sqrt{239}$	1/2549	1/2636	$\sqrt{245}$					
51	1/2464	1/2549	$\sqrt{245}$	1/2636	1/2725	$\sqrt{251}$					
52	1/2549	1/2636	$\sqrt{251}$	1/2725	1/2816	$\sqrt{257}$					
53	1/2636	1/2725	$\sqrt{257}$	1/2816	1/2909	$\sqrt{263}$					
54	1/2725	1/2816	$\sqrt{263}$	1/2909	1/3004	$\sqrt{269}$					
55	1/2816	1/2909	$\sqrt{269}$	1/3004	1/3101	$\sqrt{275}$					
56	1/2909	1/3004	$\sqrt{275}$	1/3101	1/3196	$\sqrt{281}$					
57	1/3004	1/3101	$\sqrt{281}$	1/3196	1/3293	$\sqrt{287}$					
58	1/3101	1/3196	$\sqrt{287}$	1/3293	1/3392	$\sqrt{293}$					
59	1/3196	1/3293	$\sqrt{293}$	1/3392	1/3493	$\sqrt{299}$					
60	1/3293	1/3392	$\sqrt{299}$	1/3493	1/3596	$\sqrt{305}$					
61	1/3392	1/3493	$\sqrt{305}$	1/3596	1/3701	$\sqrt{311}$					
62	1/3493	1/3596	$\sqrt{311}$	1/3701	1/3808	$\sqrt{317}$					
63	1/3596	1/3701	$\sqrt{317}$	1/3808	1/3917	$\sqrt{323}$					
64	1/3701	1/3808	$\sqrt{323}$	1/3917	1/4028	$\sqrt{329}$					
65	1/3808	1/3917	$\sqrt{329}$	1/4028	1/4141	$\sqrt{335}$					
66	1/3917	1/4028	$\sqrt{335}$	1/4141	1/4256	$\sqrt{341}$					
67	1/4028	1/4141	$\sqrt{341}$	1/4256	1/4373	$\sqrt{347}$					
68	1/4141	1/4256	$\sqrt{347}$	1/4373	1/4492	$\sqrt{353}$					
69	1/4256	1/4373	$\sqrt{353}$	1/4492	1/4613	$\sqrt{359}$					
70	1/4373	1/4492	$\sqrt{359}$	1/4613	1/4736	$\sqrt{365}$					
71	1/4492	1/4613	$\sqrt{365}$	1/4736	1/4861	$\sqrt{371}$					
72	1/4613	1/4736	$\sqrt{371}$	1/4861	1/4988	$\sqrt{377}$					
73	1/4736	1/4861	$\sqrt{377}$	1/4988	1/5117	$\sqrt{383}$					
74	1/4861	1/4988	$\sqrt{383}$	1/5117	1/5248	$\sqrt{389}$					
75	1/4988	1/5117	$\sqrt{389}$	1/5248	1/5381	$\sqrt{395}$					
76	1/5117	1/5248	$\sqrt{395}$	1/5381	1/5516	$\sqrt{401}$					
77	1/5248	1/5381	$\sqrt{401}$	1/5516	1/5653	$\sqrt{407}$					
78	1/5381	1/5516	$\sqrt{407}$	1/5653	1/5792	$\sqrt{413}$					
79	1/5516	1/5653	$\sqrt{413}$	1/5792	1/5933	$\sqrt{419}$					
80	1/5653	1/5792	$\sqrt{419}$	1/5933	1/6076	$\sqrt{425}$					
81	1/5792	1/5933	$\sqrt{425}$	1/6076	1/6221	$\sqrt{431}$					
82	1/5933	1/6076	$\sqrt{431}$	1/6221	1/6368	$\sqrt{437}$					
83	1/6076	1/6221	$\sqrt{437}$	1/6368	1/6517	$\sqrt{443}$					
84	1/6221	1/6368	$\sqrt{443}$	1/6517	1/6668	$\sqrt{449}$					
85	1/6368	1/6517	$\sqrt{449}$	1/6668	1/6821	$\sqrt{455}$					
86	1/6517	1/6668	$\sqrt{455}$	1/6821	1/6976	$\sqrt{461}$					
87	1/6668	1/6821	$\sqrt{461}$	1/6976	1/7133	$\sqrt{467}$					
88	1/6821	1/6976	$\sqrt{467}$	1/7133	1/7292	$\sqrt{473}$					
89	1/6976	1/7133	$\sqrt{473}$	1/7292	1/7453	$\sqrt{479}$					
90	1/7133	1/7292	$\sqrt{479}$	1/7453	1/7616	$\sqrt{485}$					
91	1/7292	1/7453	$\sqrt{485}$	1/7616	1/7781	$\sqrt{491}$					
92	1/7453	1/7616	$\sqrt{491}$	1/7781	1/7948	$\sqrt{497}$					
93	1/7616	1/7781	$\sqrt{497}$	1/7948	1/8117	$\sqrt{503}$					
94	1/7781	1/7948	$\sqrt{503}$	1/8117	1/8288	$\sqrt{509}$					
95	1/7948	1/8117	$\sqrt{509}$	1/8288	1/8461	$\sqrt{515}$					
96	1/8117	1/8288	$\sqrt{515}$	1/8461	1/8636	$\sqrt{521}$					
97	1/8288	1/8461	$\sqrt{521}$	1/8636	1/8813	$\sqrt{527}$					
98	1/8461	1/8636	$\sqrt{527}$	1/8813	1/8992	$\sqrt{533}$					
99	1/8636	1/8813	$\sqrt{533}$	1/8992	1/9173	$\sqrt{539}$					
100	1/8813	1/8992	$\sqrt{539}$	1/9173	1/9356	$\sqrt{545}$					

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C-401 (REVISED 2-3-49)

CHECK LIST FOR CRIME CHIC

Date: 4/23/2014

1. Configuration as desired.
2. Manometer wells set at proper level.
3. Manometer lights all working.
4. Balance chamber clock correct.
5. Proper data posted on manometer boards and engine panel.
6. All cameras operating properly.
7. Obtain zero reading manometer board pictures.
8. Check scales and first zero reading.
9. Picture and reading number counters set properly.
10. Proper test number posted on engine panel and given out to crew.
11. Panel gages and controls properly labelled.
12. Check tunnel static pressure tubes.
13. Check control room AB manometer with balance chamber manometer board.
14. Check general instrumentation.
15. Check final zero reading on scales.
16. All "squawks" reported.
17. All films accounted for at end of shift.

[illegible]

Form

Date

To

From

REQUEST FOR EQUIPMENT REPAIR OR ALTERATION

1. Equipment to be repaired or installed at

2. Symptoms of faulty operation

3. Action taken

4. Operational sequence

5. Remarks

THE NEW YORK TIMES

Dato

[illegible]

THE UNIVERSITY OF CHICAGO

TECHNICAL

Date: 11/14/42

[illegible]

C. 801 (REVISED 2-3-49)

Operation Low Engine

[illegible]

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JUSTIFICATION OF NEED FOR CONSTRUCTION FOR
FLUID AND GAS DYNAMICS ANALYSIS LABORATORY

1510

1. DESCRIPTION

This project consists of the construction of a fluid and gas dynamics laboratory building and spherical pressure tank. The location, plan, elevation, and general details are shown on the attached drawing DD-28028.

The building will be of brick construction to conform to the architectural treatment of the existing buildings in the area. The spherical compressed-air storage tank will be steel. Both the building and the tank will have reinforced concrete footings on piles. Floors, coping, and roof will be concrete; roofing will be built up. And all flashing will be lead. The concrete floors on the second floor will be covered with asphalt tile, inside shop walls will be glazed brick and the office walls will be hollow tile plastered. All millwork will be wood. Fluorescent lighting and steam heating will be provided.

The building will be built around the sphere so that connections to the tank are easily made to the test rooms on the north and south sides. The first floor of the south portion of the building will be used as a shop and housing for compression equipment and motor generator sets. The second floor will have a work room for draftsmen and engineers, office space for computers, engineers, secretary, and section head. A projection room and dark room are included, also men and women's salivator lab.

2. JUSTIFICATION

Research by the Fluid and Gas Dynamics Analysis Section is performed in the field of high-speed flow and is directed toward the development and improvement of high-speed aircraft and propulsion devices. Significant achievements have been accomplished in spite of restrictions imposed by crowded, decentralized working spaces, and inadequate sources of compressed air necessary to operate the test equipment. The proposed new equipment will increase the value of future research by permitting more efficient utilization of testing time, a greater scope of test investigations, and improved supervision and coordination of facilities.

Scope of Research Many of the projects under investigation by the laboratory have been directed toward the development of airplanes and their components to permit practical, safe, and economical flight at higher speeds. In these investigations, the most important problems deal with manifestations of compressibility phenomena near sonic speeds where critical changes in

the air flow over which seriously limit aircraft performance. Although some progress has been made in understanding the nature of this air flow with the associated formation of shock wave discontinuities and boundary layer separation, significant improvements in characteristics have been obtained mainly by postponing the adverse compressibility effects to higher speeds. The recent emphasis on jet-propulsion systems for developing large amounts of power at high speeds, and the blowers for providing adequate cooling air flow, have required the development of special airfoil sections that will operate efficiently when placed in cascade, as in blower and turbine wheels. Because so little information is available upon which to base the design of these airfoils in cascade, progress on the development of efficient blowers and turbines has been seriously delayed. Much additional effort must be spent and adequate facilities must be provided if the problems associated with high-speed flight are to be solved. Especially is this true for the super-critical and supersonic regions. The results of these investigations will be directly applicable to the aerodynamic design of high-speed aircraft; the improvement of propellers; the development of efficient blower, turbines, and superchargers; and increasing the efficiency of jet-propulsion systems. Significant improvements in these various fields will serve to make high-speed flight (approaching the speed of sound) practicable and economical.

The NACA Fluid and Gas Dynamics Analysis Section is engaged in fundamental research and engineering research development in the following categories:

1. The design and improvement of the components of jet-propulsion and gas-turbine units.
 - (a) The study and improvement of blading for high-performance turbines and compressors.
 - (b) The development of new type compressors for very high pressure rise in a single stage with high mass flows.
2. The study of the phenomena of intermittent flows.
 - (a) A detailed study of the formation of shock waves, the phenomena of their travel, and application of the fundamental principles of intermittent flow to compressors and jets.

3. The investigation of the nature of flow in the transonic and supersonic region, including the supersonic regions above those obtainable in the present supersonic tunnels.

- (a) A study of the flow about bodies in airstreams of very high Mach number (up to approximately 4) where the flow is everywhere supersonic.
- (b) The study of the mechanism of shock waves and their interaction with boundary layers.
- (c) The study of the limitations of research equipment used at high speeds, such as wind tunnels and whirling arms.

With regard to the first category of research, advancements have been made in the development of cascade airfoil sections. A report entitled, "Blade Design Data for Axial-Flow Fans and Compressors" by S. M. Bogdonoff and R. E. Bogdonoff, the low-speed cascade data are presented. The entrance vane design problems are covered by a report entitled, "Data for Design of Entrance Vanes from Two-Dimensional Tests of Airfoils in Cascade" by C. M. Zimney and V. M. Gippi. A substantial increase in performance and efficiency of the General Electric BH-1 turbosupercharger was effected by a redesign of the original blades. These results are presented in a report entitled, "Cascade Investigation of Buckets Designed by G. E. and NACA for G. E. BH-1 Turbosupercharger" by A. Kantrowitz and S. H. Ewin. However, these indicated improvements, which will result in the turbines of higher power output and compressors of high efficiency with lower stage speeds for the same pressure rise, cannot be fully developed without equipment affording higher test speeds, wider operating conditions, and increased testing time.

In the study of intermittent flows, information is being obtained on the formation, travel, and reflection of shock waves which is of use in the design of jet augmentors, gas turbines, turbo-jet units, and jet motors as used in the "buzzbomb".

Important discoveries have been made regarding the behavior of air at high speeds, applicable to the design of high-speed compressors and turbines. Results presented in the report entitled, "Preliminary Investigation of Supersonic Diffusers," by A. Kantrowitz and C. Oup. Donaldson are now being applied in many projected supersonic aircraft designs. Existing equipment will not be adequate for the proper continuation of these and similar high-speed flow studies requiring larger models and higher test speeds.

Uses and Limitations of Present Facilities The items of equipment used in carrying out the work are enumerated in the attached tables. The particular use of the equipment, and the present limitations on testing time, is indicated. It is noted that running time is dependent on the inadequate power supply available for other purposes. Much of this equipment was set up in the buildings of other activities as a temporary expedient. The space available is very restricted, resulting in inefficient operation of the equipment as well as interfering with the operation of the groups providing the space. Because of the decentralization of test equipment, adequate supervision of work in progress is difficult.

At five units, the low-speed two-dimensional cascade tunnel, the low-speed circular cascade tunnel, the low-speed single-stage test blower, the high-speed two-dimensional cascade tunnel, and the high-speed compressor are the basic machines used in the compressor and turbine blade design program. The blades are tested first in the two-dimensional cascade tunnel (low speed), the entrance vanes are checked in the circular tunnel, and the compressor blades are tested in the test blower. High-speed performance is evaluated by the cascade tunnel at high Mach numbers in the high-speed two-dimensional cascade tunnel. Developments which must be tested at high speeds are checked in the high-speed compressor. It is seen that any delay in one of the machines holds up the entire program.

The low-speed two-dimensional cascade tunnel and the single-stage test blower are located in the low-turbulence tunnel building. The air supply for this cascade tunnel and the drive motor for the test blower are both dependent for power on a 400 set which is also for operating powered models in the low-turbulence wind tunnel. Only one piece of equipment may be operated at a time, and then only when the power is not being required by the low-turbulence tunnel. The floor space available for this cascade tunnel is inadequate for efficient set up and operation of the equipment, being only 6 feet by 12 feet. Approximately 10 feet by 18 feet of floor space is available for the test blower, but the addition of new instruments such as a hot wire thermometer and a torque measuring device cause serious crowding that interferes with assembly and disassembly of the blower.

Because of lack of space and facilities, the circular cascade tunnel was installed in the full-scale building, three blocks away, using a blower which previously supplied air for the old gust tunnel. The power for this blower comes from a 400 set which also supplies power for the model full-scale tunnel and special tests in the full-scale tunnel. The model tunnel is in operation almost continuously and the blower is shared with the Instrument Research Division for their low-speed calibration tunnel. Therefore, the time available for testing in the circular cascade tunnel is approximately six to eight hours per week, which is much below that which could be used.

The high-speed two-dimensional cascade tunnel and the high-speed test compressor are both located in the old variable density tunnel building and are operated with air under pressure supplied from the variable density tunnel tank. Because of other demands on this air supply the cascade tunnel is increasingly dependent on an alternate air supply available at infrequent intervals when the two-dimensional pressure tunnel is blown down.

Development of cascade work on the above pieces of equipment is hampered by inadequate sources of power which provide only 50 percent of the required testing time. Further development will require, in addition, that the upper end of the speed range now available with the high-speed cascade tunnel and test blower be extended to include speeds encountered in high speed flight.

Phenomena of shock waves encountered in intermittent flow are studied with apparatus comprising an air jet and a ring of rotating tubes utilizing compressed air from the variable density tunnel tank. The inadequate volume of air supplied by this source, and the requirements of other equipment on the same source, greatly limit the scope and operation of the intermittent flow equipment. In addition, there is a disadvantage in that the apparatus is operated in a location where it endangers intricate electronic and optical instruments used in conjunction with other research equipment.

The investigation of transonic and supersonic flow is carried out with a 1-inch and a 2-inch jet. These jets are located in the old variable density tunnel building and utilize compressed air from the variable density tunnel tank or, alternatively, the air supplied by the infrequent blow-down of the two-dimensional pressure tunnel. As noted previously, inadequate testing time is provided by these two sources. Research currently under way indicates that larger test section areas will be required in future investigations. With present power sources it will not be feasible to enlarge the test sections of these jets.

The space provided for the two jets is barely adequate to contain the equipment and delicate instrumentation required in the conduct of research. The remaining working space is so limited as to require undue caution to avoid upsetting the finely adjusted instruments.

To increase the utility and scope of research performed by the NACA group, new facilities based on an adequate source of power are urgently needed. Testing time available will be greatly increased by the proposed facilities as indicated in the accompanying table. Centralization of equipment will permit more efficient use of personnel as well as equipment. The proposed power supply will permit an increase of the speed ranges and model sizes used in this research.

ESTIMATE

Compressor (30,000 cu ft)	205,000.00
Compressor Building	110,000.00
Utilities	18,000.00
High pressure equipment at super sonic tunnel	7,000.00
Sphere to hold air at 8 atm. 752,166 millimeter	125,000.00
Pipes and reinforced concrete foundation for sphere	15,000.00
Compressor to pump to 8 atm. and handle 14,000 cu ft	110,000.00
of air per minute	
Electrical	
A. Elect. Dist. System Main Drive	50,000.00
B. Elect. Dist. System Building Light and Power	10,000.00
C. Main Drive Switch Gear (Two Speed)	19,000.00
D. 110V Set and Switch Gear	26,000.00
E. Equipment Foundations	11,000.00
F. Connection of Equipment	11,000.00
Gasoline Distribution System	5,000.00
Fire Fighting Equipment	13,000.00
New Research and Miscellaneous Laboratory Equipment	160,000.00
Total	715,000.00
Engineering	54,000.00

TOTAL COST OF PROJECT \$ 769,000.00

ESTIMATED CONSTRUCTION SCHEDULE

Preparation of plans and specifications	2 months
Delivery of materials	12 months
Actual construction	12 months

FACILITIES OF FLUID AND GAS DYNAMICS ANALYSIS SECTION SHOWING
 RUNNING TIME NOW AVAILABLE AND TIME AVAILABLE WITH PROPOSED NEW GAS DYNAMICS LABORATORY

NAME	USE	DESCRIPTION	RUNNING TIME AVAILABLE AND POWER SUPPLY	RUNNING TIME WITH PROPOSED FACILITIES
1/2 inch supersonic jet	Development of supersonic diffusers; study of the interaction of shock waves and boundary layer; development of blades for compressors designed to operate at supersonic speeds.	1" wide by 3" deep; Mach number up to 6.	Approximately one hour per day from the VDT tank.	Unlimited running time.
1/2 inch supersonic jet	Investigation of supersonic diffusers with varying contraction ratio; investigation of flows around three-dimensional bodies at very high Mach numbers and a study of the effects of boundary layer control at supersonic speeds.	1" wide by 12" deep; Mach numbers up to 4.	Approximately one 1/2 sec. run per day from VDT tank. At lower Mach number and using VDT blowdowns, approximately 3 min. runs three times month.	Runs of 5 minutes at top Mach number 5 to 6 times per day.
High speed test compressor driven by an air turbine	Tests of compressors of new types designed to get very high pressure rises in a single stage by using blades operating at supersonic speeds.	16" diameter driven by an air turbine of approximately 200 hp. Compressor operates in a closed system filled with Freon at a reduced pressure.	1/2 runs at 15 minutes per day from VDT.	Unlimited testing time.

Turbine test stand.	Tests of turbine blades developed in the cascade studies at low and high speeds.	Test stand capable of cold air turbines now used in turbo-jet units.	5 minutes per run - two runs per day from the VDT tank on turbo-supercharger turbines (on large turbines from turbo-jet units); available air supply is insufficient for air tests.	One hour per day.
Low speed two-dimensional cascade tunnel.	Development of blade sections with high critical speeds for entrance vanes, blower blades, and turbine blades.	3' wide, 22" deep, velocities up to 150 ft/sec from a 25 hp blower.	Two hours per day from VDT generator shared with VDT blowers and the low speed test blower.	Unlimited testing time.
High speed two-dimensional cascade tunnel.	Testing of compressor and turbine blade sections at high Mach numbers to determine critical speed and choking limit. Also testing of turbine nozzles.	4' wide, 18" deep, driven by the jet to a Mach number of 0.9 entering air used from VDT tank and VDT blowdowns when available.	(a) 6 min. per tank of air, total of 12 min. per day from VDT. (b) 20 min. per VDT blowdown (approximately 3 times per month).	Two hours per day.
Low speed circular cascade tunnel.	Tests of entrance vanes in three dimensions and investigation of flow types such as vortex and solid body, to determine best flows for compressor design.	20" dia diameter, 10" dia diameter, velocities up to 100 ft/sec driven by 25 hp blower.	One hour per day since power comes from VDT, not shared with Model Full-Scale Tunnel and Model accessories located in Full-Scale building, three blocks from Section Office.	Unlimited testing time.

high-speed air-
cicular cascade
tunnel

Check of slow-speed
design of com-
pressor and turbine
blades at Mach num-
bers up to the
existing limit. Pro-
vides final data
from a stationary
setup to predict
maximum pressure
rises and power
available.

11.5 in. diameter
70 in. hub diameter
driven by a jet
pump from the VDT
tank

ten minutes per day from the
VDT

One hour
per day

slow-speed test
blower

Investigation of blades 28 in. diameter
developed in cascade
tunnels and the obtain-
ing of efficiencies of
blades designed to give rather or more than
very high pressure
ratios per stage and
higher efficiencies
than blading now in use.

22 in. hub diameter
3,000 r.p.m. 75 hp.
located in Old
tunnel and the VDT blowers.

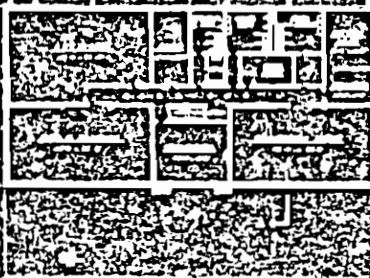
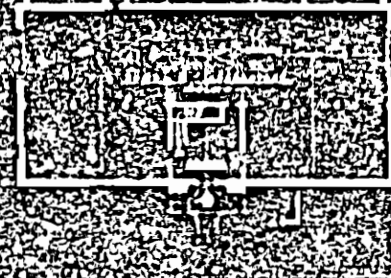
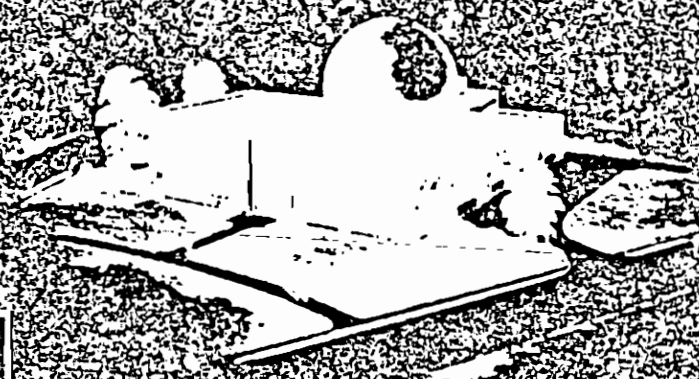
Unlimited
testing time

high Mach number
tunnel

This tunnel will supply
ment other high-speed
equipment by getting
data at very high Mach
numbers (up to 4) on
bodies suitable for air-
craft or missiles.

Test chamber 12
in. diameter
driven directly
by high pressure
air exhausting
from a tank to
the atmosphere.

Five minutes
runs six times
per day at top
Mach number (4).



Date:

C 804 (REVISED 2-3-48)

Order

C-60 (REVISED 2-3-49)

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86	75	76	77	78	79	80	81	82	83	84	85	86
87	75	76	77	78	79	80	81	82	83	84	85	86
88	75	76	77	78	79	80	81	82	83	84	85	86
89	75	76	77	78	79	80	81	82	83	84	85	86
90	75	76	77	78	79	80	81	82	83	84	85	86
91	75	76	77	78	79	80	81	82	83	84	85	86
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96	75	76	77	78	79	80	81	82	83	84	85	86
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103	75	76	77	78	79	80	81	82	83	84	85	86
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113	75	76	77	78	79	80	81	82	83	84	85	86
114	75	76	77	78	79	80	81	82	83	84	85	86
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116	75	76	77	78	79	80	81	82	83	84	85	86
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122	75	76	77	78	79	80	81	82	83	84	85	86
123	75	76	77	78	79	80	81	82	83	84	85	86
124	75	76	77	78	79	80	81	82	83	84	85	86
125	75	76	77	78	79	80	81	82	83	84	85	86
126	75	76	77	78	79	80	81	82	83	84	85	

Equivalent Flight Conditions

Testa

0.5%

[illegible]

106

**RD
21**

Correction Factors

Test No.

DATA

[illegible]

C. 501 (REVISED 2-3-49)

036

C-801 (Revised 2-9-49)

AND DEAD OR ALIVE

C-8015 (Revised 2-3-49)

T. brachylopha

File # ZR-62

II. Indicated Temperatures: °R

DATE

DMC

Test No. 6020-50 (T.O. 7-51)

[illegible]

石井ノ

Abstract

Pressure Losses

Editorial Observer

	Test No.										Sample	
	26	26	27	28	29	30	31	32	33	34	35	36
Rdg No.	H ₇	H ₇	H ₈	H ₈	H ₂	H ₃	WEC H ₄	H ₅	Turb out OR	H ₆ -H ₁ H ₅	H ₆ -H ₁ H ₅	H ₆ -H ₁ H ₅
	msl	msl	msl	msl	msl	msl	msl	msl	msl	(2) (3)	(2) (3)	(2) (3)

20

IV. Colored Temperatures (cont.)

VIII Temperature Rethat

VIII. Equivalent Flight Conditions

204

0000

石炭系

口右

[illegible]

Deaf

Ring

9/10/21/89/2592

[illegible]

XIV. Component Efficiencies

Defining

Other

店名

店在

	97	98	99	100	101	102	103	104	105	106	107	108
Rdy No.	1-3 11-17 	(4) 11-17 11-17 	1-5 11-17 11-17 	7-6 	11-2 11-17 11-17 	11-3 11-17 11-17 	Δhc 	Δhc 	Tm chaf 11-17 	11-17 11-17 11-17 	Yc 11-17 11-17 	Yc-1 Yc 11-17 11-17

0207

Date _____

III Generalized Parameters (cont'd)

IV. Turbine Parameters

Test No.

Life

	157	158	159	160	161	162	163	164	165	166	167	168
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170	171	172	173	174	175	176	177	178	179	180	181	182
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295	296	297	298	299	300	301	302	303	304	305	306	307
309	310	311	312	313	314	315	316	317	318	319	320	321
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[illegible]

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742	743	744	745	746	747	748	749	750	751	752	753	754
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768	769	770	771	772	773	774	775	776	777	778	779	780
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820	821	822	823	824	825	826	827	828	829	830	831	832
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911	912	913	914	915	916	917	918	919	920	921	922	923
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937	938	939	940	941	942	943	944	945	946	947	948	949
950	951	952	953	954	955	956	957	958	959	960	961	962
963	964	965	966	967	968	969	970	971	972	973	974	975
976	977	978	979	980	981	982	983	984	985	986	987	988
989	990	991	992	993	994	995	996	997	998	999	1000	1001

Test No. _____ Date _____

[illegible]

Project

Project No. _____

	121	122	123	124	125	126	127	128	129	130	131	132
Adg Loc	113	PP	114	(12) (12)	115 K ₂ Vap	116 K ₂ Vap	117 K ₂ Vap	118 K ₂ Vap				
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132	133	134	135	136	137	138	139	140	141	142	143	144
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1003	1004	1005	1006	1007	1008	1009	1010	1011	1012	1013	1014	1015
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1484	1485	1486	1487	1488	1489	1490	1491	1492	1493	1494	1495	1496
1497	1498	1499	1500	1501	1502	1503	1504	1505	1506	1507	1508	1509
1510	1511	1512	1513	1514	1515	1516						